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## IV.

### *A History of the Fishes of Massachusetts.*

By DAVID HUMPHREYS STORER, M. D., A. A. S.

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As one of the Commissioners on the Zoölogy of Massachusetts, in the year 1839, I prepared a Report on the Ichthyology of the State. From the brief time occupied in its preparation, it was necessarily imperfect, and, not being accompanied by figures, was comparatively useless, except to scientific men. Since the appearance of that communication, much information has been obtained respecting several of the most common and valuable fishes, and quite a number of new species have been ascertained to exist in our waters.

Having carefully re-described all the species, I trust the following paper will present an accurate history of the fishes of our State. Considering this as the completion of my former Report, I have kept in view the primary object of the commission, — to ascertain the value of our Fauna in an economical point of view, rather than to prepare labored scientific descriptions.

To all who have aided me since this paper was commenced, or rather since my attention was first directed to our ichthyology, I would return my grateful acknowledgments. The following gentlemen, to whom in my previous Report I remarked I was under peculiar obligations, I cannot pass by unnoticed : —

Thomas Kidder, Esq., of the General Inspection Office, Boston, for his polite attention in furnishing me with all the statistical information in his power regarding the quantities of fish inspected in the State ;

C. R. Vickery, Esq., of Taunton, for his very acceptable remarks respecting the fisheries of Taunton River ;

Hiram Hosmer, M. D., of Watertown, for his numerous and valuable facts concerning the fisheries of Charles River ;

Elisha Bartlett, M. D., of Lowell, for his interesting account of the fisheries of the Merrimack River ;

J. B. Forsyth, M. D., of Chelsea, formerly of Sandwich, for much useful information respecting the fishes taken along " the Cape " ;

Jonathan Johnson, Jr., of Nahant, for several very rare species, and many valuable observations concerning more common fishes.

To Captain Nathaniel Blanchard, a veteran fisherman of Lynn, and Leroy M. Yale, M. D., of Holmes's Hole, I am most deeply indebted ; — to the *former*, for his constant and unwearied efforts to serve me amid the fatigues of his arduous occupation, during the entire period I was engaged in the State Survey, and for many judicious remarks and valuable details imparted to me, respecting the fishes and fisheries of the northern shore of Massachusetts Bay ; and to the *latter*, for his *invaluable aid*. To him I am not only obliged for specimens of nearly *one fifth* of all the species I have described, and which, but for him, I could not have procured, but also for many specimens of more common species, and much valuable information respecting them. Since these observations were made, my excellent friend, Dr. Yale, while in the faithful discharge of his professional duties, contracted a malignant disease, the attack of which he survived but a few days. By his death, science has lost an enthusiastic votary, and his profession a most honorable member.

During the last six or eight years, no individual has rendered me such essential assistance as Captain Nathaniel E. Atwood, of Provincetown. For nearly thirty years a practical fisherman, thoroughly acquainted with the habits of most of our fishes, and willing and ready to do all in his power to advance my wishes, he has placed me under obligations which I cannot express. For several fishes never before described, and for much acceptable information respecting each of our marketable species, I am indebted to him, the best practical ichthyologist in our State.

To Professor Agassiz my thanks are due for many valuable suggestions in the preparation of this work, and to his accomplished draughtsman, Mr. Sonrel, for the admirable plates which illustrate it.

In my nomenclature, I have been guided, as far as possible, by the principle which would give the credit of a species to the author who first placed it under its appropriate genus. This plan, I am led to understand, is about being adopted by our most eminent naturalists.

In addition to the works mentioned in my "Synopsis of the Fishes of North America," the following have been consulted in the preparation of this paper : —

*Richardson.* Report on North American Zoölogy. London. 1837.

*Schomburghk.* History of Barbados. London. 1848.

Zoölogy of Beechey's Voyage to the Pacific. 4to. London. 1839.

Magasin de Zoölogie, par Guérin de Méneville. 8vo. Paris.

*Agassiz.* Lake Superior. 8vo. Boston. 1850.

*Storer, H. R.* Observations on the Fishes of Nova Scotia and Labrador, in Boston Journal of Natural History, Vol. VI. 1850.

*Perley.* Catalogue of the Fishes of New Brunswick and Nova Scotia. Frederickton. 1837.

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## CLASS I. OSSEOUS FISHES.

SKELETON bony, the osseous matter being deposited in fibres. Sutures of the cranium distinct, with maxillary or intermaxillary bones, always one, and generally both, present. Gill-membrane with rays.

### ORDER I. ACANTHOPTERYGII. SPINE-RAYED.

They are known by the spines which represent the first rays of the dorsal fin, or which alone sustain the anterior fin of the back, when they have two. Sometimes, instead of an anterior dorsal fin, they have nothing but a few free spines. Their anal fin has also some spines instead of the first rays, and there is, in general, one to each ventral.

#### FAMILY I. PERCIDÆ.

Comprehends fishes with an elongated body, covered with hard or rough scales, in which the operculum or preoperculum, and frequently both, have indented or spinous edges, and in which the jaws, the front of the vomer, and almost always the palatines, are furnished with teeth.

#### GENUS I. PERCA, Cuv.

Two dorsal fins distinct, separated ; the rays of the first spinous, those of the second flexible ; tongue smooth ; teeth in both jaws, in front of the vomer, and on the palatine bones ; preoperculum notched below, serrated on the posterior edge ; operculum bony, ending in a flattened point directed backwards. Branchiostegous rays. Scales roughened, and not easily detached.



PERCA FLAVESCENS, Cuv.  
*The American Yellow Perch.*

(PLATE II. FIG. 1.)

- Bodianus flavescens*, Yellow Perch, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., I. p. 421.  
*La Perche jaunatre d'Amérique*, *Perca flavescens*, CUV. et VAL., Hist. Nat. des Poissons, II. p. 46.  
*Perca flavescens*, American Perch, RICH., Fauna Boreal. Americ., III. p. 1, pl. 74.  
 " " Common Perch of Massachusetts, STORER, Massachusetts Report, p. 5.  
*Bodianus flavescens*, Yellow Perch, KIRTLAND, Rep. on Zool. of Ohio, pp. 168, 190.  
*Perca flavescens*, Yellow Perch, KIRTLAND, Bost. Journ. Nat. Hist., V. p. 337, pl. 27, fig. 2.  
 " " American Yellow Perch, DEKAY, N. Y. Report, p. 3, pl. 1, fig. 1.  
 " " AYRES, Bost. Journ. Nat. Hist., IV. p. 256.  
 " " American Yellow Perch, LINSLEY, Cat. of Fishes of Conn.  
*La Perche à opercules grenues*, *Perca serrato-granulata*, CUV. et VAL., II. p. 47.  
*Perca serrato-granulata*, GRIFFITH'S CUV., X. pl. 39, fig. 1.  
 " " DEKAY, N. Y. Report, p. 5, pl. 22, fig. 64.  
 " " Common Perch, THOMPSON, Hist. Vermont, p. 129.  
*La Perche à tête grenue*, *Perca granulata*, CUV. et VAL., VII. p. 48, pl. 49.  
*Perca granulata*, JARDINE, Nat. Lib., I. p. 92, pl. 1.  
 " " DEKAY, N. Y. Report, p. 5, pl. 48, fig. 220.  
 " " LINSLEY, Cat. of Fishes of Conn.  
*La Perche à museau pointu*, *Perca acuta*, CUV. et VAL., II. p. 49, pl. 10.  
*Perca acuta*, Sharp-nosed Perch, RICH., Fauna Boreal. Americ., III. p. 4.  
 " " Yellow Perch, DEKAY, N. Y. Report, p. 6, pl. 68, fig. 222.  
*La Perche grêle*, *Perca gracilis*, CUV. et VAL., II. p. 50.  
*Perca gracilis*, RICH., Fauna Boreal. Americ., III. p. 4.  
 " " Slender Yellow Perch, DEKAY, N. Y. Report, p. 6.  
*Perca flavescens*, STORER, Mem. of Amer. Acad., New Series, II. p. 269.  
 " " STORER, Synopsis, p. 17.  
 " " AGASSIZ, Lake Superior, p. 291.

*Color.* Above of a greenish-yellow; sides golden-yellow, crossed by seven transverse dark bands, all broader above than below, and those upon the middle of the body broadest. Abdomen white; lower jaw tinged with pink. Centre of operculum of a deep green. Head darker than rest of body. Pupils back; irides golden. Dorsal and caudal fins yellowish-brown; pectorals yellow; ventrals and anal a bright scarlet.

*Description.* The length of the head is less than one fourth of the entire length. Top of head broad and flattened; that portion of it between and in front of eyes is naked, and covered by a smooth membrane; the portion back of eyes is bony, and roughened by raised, radiating striæ. The preoperculum is scaled, and serrated along its entire edge, save a small portion of its superior posterior angle, which is naked and smooth. The operculum is a subtriangular bone, covered at its upper part by a few scales, but otherwise almost entirely scaleless, and exhibiting numerous raised lines diverging to its outer edge, which presents in some instances a few serrations, and terminates posteriorly in a sharp angle or spine. The subopercle is scaled above, naked beneath, and minutely denticulated along its edge. The scapular bones are

slightly corrugated by striæ. The humeral bones are strongly denticulated. Eyes of moderate size, preceded by several mucous pores. The anterior nostril much in advance of the posterior, which is the larger. The lateral line commences at the humeral bone, and, assuming the curve of the body, is continued to the base of the tail.

The first dorsal fin arises nearly on a line with the pectorals; its height is equal to one third of its length. The rays are very stout, their naked extremities projecting above the transparent membrane connecting them; fin rounded posteriorly. I have seen several specimens in which the fourth and sixth rays of this fin were about one half the height of the third and fifth rays, and the connecting membrane was continued directly above their extremities, as if they were absent. The membrane stretching from the last ray of the first dorsal fin extends to the first of the second dorsal.

The second dorsal is subquadrangular, rounded above; it is more than half the length of the first. The first ray is very minute, and, as well as the second, is spinous; the third ray is simple: all the soft rays are articulated.

The pectorals arise just beneath the humeral bone. They are quite long; fan-shaped; their rays are bifurcated and articulated.

The ventrals are subtriangular; they arise at a distance back of the pectorals equal to one third their height; their outer ray is a strong spine, the others are multifid.

The anal is higher than long, and arises about opposite the middle of the second dorsal; its first two rays are spinous, the first less than one half the height of the second.

The caudal is deeply emarginate.

The fin rays are as follows:—B. 7. D. 13. 2–13. P. 15. V. 1–5. A. 2–8. C. 18. Length 12 to 15 inches.

In this species, as in many others, I have represented two scales, one from the lateral line, and one from above it, whose characters will sufficiently distinguish them.

*Remarks.* This species is universally distributed throughout the State. In the spring and autumn, it is frequently found in the market, and is readily sold. When young, it usually swims in extensive shoals, while the larger ones remain in the deepest water, and by themselves. It does not take its food timidly, but seizes it instantly without nibbling. It is not only caught with the hook in summer, but also through the ice in winter, with pickerel, and in pretty large quantities in brooks while netting for alewives. Individuals are seldom taken which measure more than twelve or fifteen inches in length. Mr. Ayres has seen a specimen weighing two and a half pounds, and

Dekay has caught them weighing nearly three pounds. This species has been repeatedly transported from one pond to another with complete success. Dr. Mitchill transferred them a distance of forty miles.

It has been noticed in Maine, Massachusetts, STORER; New Hampshire, H. R. STORER; Vermont, THOMPSON; Connecticut, AYRES; New York, MITCHILL, DEKAY; Pennsylvania, HALDEMAN; Ohio, KIRTLAND; and in all the ponds and streams of the great lakes, RICHARDSON, AGASSIZ; New Brunswick and Nova Scotia, PERLEY.

## GENUS II. LABRAX, Cuv.

Distinguished from the Perch by the scaly opercula, terminating with two spines, and by a tongue covered with prickles.

### LABRAX LINEATUS, Cuv.

#### *The Striped Bass.*

(PLATE I. FIG. 4.)

*Sciæna lineata*, BLOCH, pl. 304.

*Perca Mitchilli*, *Striped Bass or Rock-fish*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., i. p. 413, pl. 3, fig. 4.

*Rock Bass*, MEASE, Trans. Lit. and Phil. Soc. of N. Y., i. p. 502.

*Le Bar rayé (ou Rock-fish) des Etats-Unis*, *Labrax lineatus*, CUV. et VAL., II. p. 79.

*Labrax lineatus*, GRIFFITH'S CUV. x. p. 103.

" " RICH., Fauna Boreal. Americ., III. p. 10.

" " STORER, Report, p. 7.

" " AYRES, Bost. Journ. Nat. Hist., IV. p. 257.

" " DEKAY, N. Y. Report, p. 7, pl. 1, fig. 3.

" " LINSLEY, Cat. of Fishes of Conn.

" " STORER, Mem. of Amer. Acad., New Series, II. p. 273.

" " STORER, Synopsis, p. 21.

*Color.* The upper part of the body is silvery brown, with a greenish-blue tinge; the sides are lighter; the abdomen of a beautiful, clear silvery color; the opercula are more or less golden. Eight or more longitudinal black bands pass from behind the operculum towards the tail; the upper bands are lost just back of the termination of the second dorsal fin; the three or four central ones extend to the caudal fin; while the lower ones reach only the posterior portion of the anal, or are even lost anterior to that fin. Sometimes these bands are all entire; in other specimens, more or less of them are interrupted at intervals; while in others still, instead of being straight throughout, frequent undulations or curves are observed. It sometimes happens that all the bands on one side of the fish are perfect, while all on the other side of the same specimen are broken or irregular. Pupils black; irides golden.

*Description.* The form of this species is cylindrical. Length of head to entire

length of fish is as 1 to 4. The scales on the body are large and quadrangular, less than one third of scale attached, marked by concentric lines upon their sides; numerous very delicate striæ diverge from the centre of the attached base to the entire extent of the free edge. Sixty-two scales along the lateral line; ten scales in an oblique line from the origin of the dorsal to the lateral line. The whole head is covered with scales, including the intermaxillary bones, save the suborbital bones and the portion in front of and between the nostrils. The scales are largest on sides of body; smaller towards tail and on anterior back, smallest on top of head. The eyes are circular, their diameter equal to about one third the distance between them. The nostrils are situated anterior to eye, at a distance about equal to diameter of eye; the posterior is circular and the longer; the anterior is larger. The lower jaw is the longer. Teeth in jaws numerous and very small; the largest are at the middle of the upper jaw. Teeth upon the palatine bones. Tongue rough at its base and upon its sides, smooth in its centre. The *operculum* at its posterior angle is armed with two spinous processes, the lower of which is the larger and more acute; they are margined with a dark-colored membrane. The *preoperculum* at its posterior edge is very delicately and minutely serrated; these serrations are larger at its inferior margin.

The *lateral line*, which is very distinct, arises just above the superior spinous process of the operculum, and is continued in a straight course through the middle of one of the longitudinal bands, to the centre of the tail, upon the rays of which it is lost.

The first dorsal fin arises on a line with the posterior half of the pectorals; it is twice as long as high; the first ray is one sixth the height of the fourth and fifth, which are the longest rays in the fin.

The second dorsal is not as long as the first. The first ray is spinous; the second ray, which is the longest, is two thirds as high as the length of the fin.

The pectorals are situated just beneath the inferior spine of the operculum; their length to their height is as 1 to 5.

The ventrals are situated just back of the pectorals; their first ray is spinous, and three fifths as long as the second ray, which is the longest of the fin; the rays are multifid. They are of the same length as the pectorals.

The anal arises on a line with the middle of the second dorsal; its first three rays are spinous; the first of these is one fourth the height of the third. This fin is shorter than the second dorsal; it is one fifth longer than high.

The caudal at its base is equal in depth to the length of the pectorals; it is as wide again at its extremity, when expanded, as its depth at base. Fin quite deeply forked.

In each of the fins, the scales are more or less continued upon them.

The fin rays are as follows:—D. 9. 1–12. P. 18. V. 1–5. A. 3–11. C. 18. Length, 3 to 4 feet.

*Remarks.* This fine species is taken in considerable numbers upon our coast. It is generally found upon shoals near the land, where frequently a dozen or more may be seen at a time beneath the water, quietly lying upon the rocky bottom. Large quantities of small bass are caught with nets near Chelsea and Nantasket beaches. Captain Atwood writes me, that at Provincetown a few are caught in the summer with hook and line, by men standing upon the shore; and that in the months of September and October, when this fish is passing by, on its way to the South, large quantities are sometimes taken with nets, in the following manner. Several men put off from the Race in a boat, with a net from seventy to eighty fathoms long and from three to four fathoms deep; when the boat is at a short distance from shore, a line attached to the net is thrown ashore, and secured by some of the fishermen there in waiting, and a portion of the net is dragged from the boat. As soon as the fish are seen swimming along, near the bottom, the rest of the net is let out of the boat, which is now rowed ashore, while the other extremity of the net is drawn thither by the rest of the gang. In this way hundreds are taken at a haul; but as a large number of men is required, and considerable time is necessarily expended, this business is not very profitable, and is not attended to, unless it be at times of leisure from other pursuits. At Buzzard's Bay they are speared by torch-light to some extent, in the month of May.

In the winter, this species goes up into the rivers and arms of the sea. It is most common in Boston market in autumn and winter. At some seasons of the year it is taken in large numbers in seines, while at others the market is partially supplied by those taken with the hook, and consequently its price varies, from three to twelve cents per pound. It is most readily taken by the hook, when it is baited with the Squid (*Loligo illecebrosa*). The larger individuals feed voraciously upon this animal, and are hence called "Squid-hounds." The flesh of this species, particularly of the larger ones, is rather coarse, but meets with a ready sale when fresh. In 1836, a small number of barrels (67) was packed and inspected. Bass of considerable size are often taken in Boston harbor. In July, 1837, I saw a specimen weighing 36 pounds, which had been taken from one of the city bridges over Charles River; and I have been told that another, weighing 77 pounds, had been taken from the same bridge. The largest individual I have known to be taken by any of our fishermen weighed 84 pounds.

New Brunswick, PERLEY. Maine, New Hampshire, and Massachusetts, STORER. Connecticut, AYRES. New York, MITCHILL, CUVIER, DEKAY.

LABRAX RUFUS, *Dekay*.*The White Perch.*

(PLATE I. FIG. 1.)

*Bodianus rufus*, Red Perch, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., 1. p. 420.*Le petit Bar d'Amérique*, *Labrax mucronatus*, CUV. et VAL., II. p. 86, pl. 121.*Labrax mucronatus*, Small American Bass or White Perch, STORER, Report, p. 8.*Labrax rufus*, Ruddy Bass, DEKAY, Report, p. 9, pl. 3, fig. 7.*Labrax mucronatus*, AYRES, Bost. Journ. Nat. Hist., IV. p. 257.

" " White Perch, LINSLEY, Cat. of Fishes of Conn.

*Labrax rufus*, STORER, Mem. of Amer. Acad., New Series, II. p. 274.

" " STORER, Synopsis, p. 22.

*Color.* A silvery gray, darker above the lateral line. The sides and gill-covers exhibit metallic reflections. Lips, intermaxillaries, and tongue minutely dotted with black. Dorsals, pectorals, and caudal brown; ventrals and anal rose-colored at their base; throat also rosaceous. Pupils black; irides silvery.

*Description.* Body much compressed, a perceptible convexity in front of the first dorsal fin. The depth of the body across from the first dorsal is to the length about as  $3\frac{1}{2}$  to 10. The length of the head to the whole length of the body is as 1 to 4. The gill-covers, intermaxillary bones, and the space between the eyes are scaled; the portion in front of the eyes and nostrils is naked. The eyes are circular; their diameter is to the distance between the eyes as 3 to 5. The nostrils are situated just in advance of the superior anterior angle of the eye; the posterior is oval, the larger, and placed obliquely, pointing backwards; the anterior is circular. The upper jaw is protractile; both jaws are armed with numerous very minute teeth. The tongue has a row of very delicate teeth upon its sides. The preoperculum is serrated posteriorly and inferiorly, the serrations upon the inferior edge being much the larger. The operculum has at its posterior edge a sharp spinous process, and above this, separated by an emargination, is an obtuse point.

The scales upon their exposed surface are covered with minute dots, like those of the lips and tongue; they are denticulated at their edge. Seven scales are found in an oblique line from the lateral line to the origin of the first dorsal fin. The lateral line, which is very distinct, commences just beneath the subscapular bone, and, rising a little at first, pursues nearly a straight course, from a line opposite the commencement of the first dorsal, to the tail, including 55 scales.

The first dorsal fin arises opposite the anterior half of the pectorals, and is entirely composed of spinous rays; the first of these is the shortest, and the fourth the longest; the fin is about half as long as high. The membrane of the last ray of this fin is continued to the base of the first ray of the second dorsal, which is nearly quadrangular,

and is composed of soft rays, with the exception of the first, whose height is about two thirds that of the next. This fin is longer than high.

The pectorals are quite broad when expanded ; in height they are equal to the length of the second dorsal.

The ventrals are just back of the pectorals ; their height is equal to that of the pectorals.

The anal arises on a line with the fifth ray of the second dorsal. Its height and length are equal. It terminates on the same plane with the second dorsal. The second spinous ray is very stout.

The caudal is considerably emarginated ; the depth at its base is equal to half the depth of extremity when expanded.

The fin rays are as follows : — D. 9. 1 – 12. P. 15. V. 1 – 5. A. 3 – 9. C.  $17\frac{3}{5}$ . Length 12 to 15 inches.

*Remarks.* This species is brought to Boston market in the spring and autumn, from the mouths of the neighboring rivers, and the ponds to which the sea has access.

By the fishermen it is known as the “White Perch.” Its usual weight is about half a pound. December 12th, 1837, I saw a specimen in Boston market which measured fifteen inches in length, and weighed one pound and three quarters, and its stomach contained a specimen of the shiner, *Leuciscus chrysoleucas*, more than five inches long.

Found in New Brunswick, PERLEY ; Maine, Massachusetts, STORER ; Connecticut, AYRES, LINSLEY ; New York, MITCHILL, CUVIER, DEKAY ; South Carolina, DEKAY.

Although the *Labrax pallidus* of Dekay was introduced in my “Synopsis” as belonging to this State, I am inclined to think the two species above described to be the only ones we possess ; and that perhaps the *pallidus* and *rufus* may prove to be one and the same.

### GENUS III. CENTROPRISTES, Cuv.

A single dorsal fin ; branchiostegous rays seven ; all the teeth small and crowded ; no canines. Their preoperculum is dentated, and the operculum spinous.

#### CENTROPRISTES VARIUS, Storer.

#### *The Black Sea-Bass or Perch.*

(PLATE II. FIG. 4.)

*Perca varia*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., I. p. 415, pl. 3, fig. 6.

*Centropristes nigricans*, GRIFFITH'S Cuv., X. p. 117.

*Le Centropriste noir*, *Centropristes nigricans*, Cuv. et Val., III. pp. 37, 44.

- Centropristes nigricans*, Règne Animal, ed. VAL., pl. 9, a, fig. 1.  
 " " *Black Perch, Black Sea-Bass*, STORER, Report, p. 9.  
 " " *Black Sea-Bass*, DEKAY, Report, p. 24, pl. 11, fig. 5.  
 " " LINSLEY, Cat. of Fishes of Conn.  
 " " STORER, Mem. Amer. Acad., New Series, II. p. 237.  
 " " STORER, Synopsis, p. 35.

(*Lutjanus trilobus*, LACÉP.?)

*Color.* Of a dark brown, almost black, above; lighter beneath; of the head, sea or bronze green. In some specimens, after death, there is a greenish tinge upon the abdomen, and a bluish one upon the top and back of head. The dorsal and anal fins are white; the former crossed by black bars, the latter marked by fuliginous blotches. The pectorals are of a leaden color, varied with dark brown; the membrane of the ventrals is white, while the rays are nearly black.

*Description.* Body elongated, compressed; convex in front of the dorsal fin. Greatest depth of body equal to one fourth the length of the fish. Length of head to the posterior angle of the operculum equal to rather more than one third the length of the fish. Head, between and in front of eyes, without scales. Scales upon the sides of the body large; small upon the preopercle, and at the base of the tail. Eyes of moderate size. Nostrils double, situated just anterior to the superior anterior angle of the eyes; the anterior is tubular; the posterior much the larger. Jaws equal in length, armed with a great number of minute, sharp, card-like teeth; upper jaw protractile. Lips fleshy. The whole posterior edge of the preoperculum is denticulated; the inferior edge is serrated. A flat, sharp spine is situated at the posterior angle of the operculum, below which is a broad, fleshy elongation projecting beyond it, the posterior portion of which is destitute of scales. By the union of the opercle and interopercle, a slight notch is produced. Humeral bone denticulated. The lateral line, which is of a dark color, arises at the lower edge of the humeral bone, and assumes the curve of the body.

The dorsal fin arises on a line with the base of the pectorals; its first ten rays are spinous. At the posterior portion of each of these spines, suspended from the upper edge of the connecting membrane, is a small fleshy tentacle. The first ray is shortest, the fourth longest. The eleven fleshy rays are higher than the spinous ones, articulated and bifid; this portion extends farther back than the anal fin.

The pectorals arise just below the fleshy projection of the operculum; they are fan-shaped, quite broad when expanded, and rounded posteriorly.

The ventrals are just in front of the pectorals; the middle rays are longest; their length equal to that of the pectorals.

The anal fin commences back of the soft rays of the dorsal; the first three rays are spinous. Fin higher than long.



The caudal is slightly convex at its centre, and its upper portion projects beyond the lower. It is scaled quite high upon its rays, which are bifid and articulated.

The fin rays are as follows:—D. 10–11. P. 17 or 18. V. 1–5. A. 3–7. C. 17 or 18. Length about one foot.

*Remarks.* This species, which is known among our fishermen as the “Black Bass” and “Black Fish,” is taken in large numbers in the months of May, June, and July at Holmes’s Hole, and carried to the New York market, where it is considered one of the most valuable fishes, and meets with a ready sale. While visiting Gay-Head in August, 1846, I learned that this species had become much less abundant there than formerly. Thirty years since, it was not an uncommon circumstance for sixty sail of vessels to be fishing about Gay-Head at a time. And even fifteen years ago, this species was quite numerous; but several years since it disappeared almost entirely. They are beginning to reappear again within the last two or three years, but are quite small. They are taken about ledges in deep water, and weigh from five to eight pounds. They seldom wander into Massachusetts Bay; the few that are met with in Boston market are brought from New Bedford. July 1st, 1846, a specimen was taken at Nahant.

Massachusetts, STORER. New York to Florida, DEKAY.

This is evidently Mitchill’s *Perca varia*, and I have therefore retained his specific name.

#### GENUS IV. POMOTIS, Cuv.

A few denticulations, more or less obvious, on the borders of the preoperculum. Palatines and tongue smooth, and without teeth. Minute teeth on the jaws, vomer, and pharyngeals. Branchial rays, six. A membranous elongation at the angle of the operculum.

#### POMOTIS VULGARIS, Cuv.

#### *The Bream.*

(PLATE III. FIG. 1.)

*Le Pomotis Commun, Pomotis vulgaris*, Cuv. et VAL., III. p. 91, pl. 49, et VII. p. 465.

*Pomotis vulgaris*, Règne Animal, ed. VAL., pl. 10, fig. 3.

“ “ *Northern Pomotis*, RICH., Fauna Boreal. Americ., III. p. 24, pl. 76.

“ “ JARDINE, Nat. Lib., I. p. 162.

“ “ *Fresh-water Sun-fish, Pond Perch, Bream*, STORER, Report, p. 11.

“ “ AYRES, Bost. Journ. Nat. Hist., IV. p. 258.

“ “ *Sun-fish, Roach*, KIRTLAND, Report on Zool. of Ohio, p. 191.

“ “ *Harlequin Roach*, KIRTLAND, Bost. Journ. Nat. Hist., III. p. 470, pl. 28, fig. 2.

“ “ THOMPSON, History of Vermont, p. 130.

“ “ *Common Pond-fish*, DEKAY, Report, p. 31, pl. 51, fig. 166.

“ “ LINSLEY, Cat. of Fishes of Conn.

“ “ STORER, Mem. Amer. Acad., New Series, II. p. 292.

“ “ STORER, Synopsis, p. 40.

“ “ AGASSIZ, Lake Superior, p. 293.

*Color.* Greenish-brown above, with irregularly distributed rusty blotches; in some specimens a certain regularity is observed in the arrangement of these blotches, producing longitudinal bands along the sides. Beautiful, undulating, longitudinal deep-blue lines across gill-covers. Opercular membrane black, with a bright scarlet blotch at its posterior portion. Abdomen whitish. Dorsal, anal, and caudal fins dark brown. Ventrals and pectorals yellowish.

*Description.* Body compressed, oval. The back curves very gradually as far as the posterior extremity of the dorsal fin, then abruptly gives place to the fleshy portion of the tail. Head less than one fourth the length of the body. Eyes large, circular. Nostrils double, the anterior tubular. Mouth small; teeth very minute and sharp. The edge of the preopercle very finely denticulated. The lateral line arises at the upper posterior edge of the operculum, and, assuming the curve of the body, is lost at the base of the caudal rays. Scales upon the body large, dentated at their bases; those at the base of the fins, small.

The soft portion of the dorsal fin is highest and rounded posteriorly. The extremities of the spines of the anterior portion of this fin project above the connecting membrane; attached to them are small tubercles. The first dorsal spine is shortest; the fourth and fifth spines are the longest.

The pectorals are long, when extended reaching the soft portion of the dorsal fin.

The anal terminates on a line with the dorsal.

The caudal is emarginate.

The fin rays are as follows: — D. 10–12. P. 13. V. 1–5. A. 3–10. C. 17. Length rarely exceeds eight inches.

*Remarks.* As Agassiz, in his work on Lake Superior, considers our species as distinct from that which is known in the Southern States by the same scientific name, I have omitted several references in my list of synonymes which were retained in my “Synopsis.” It is a common species in the ponds of the various portions of the State, and is taken with the *Perca flavescens*, *Leuciscus chrysoleucas*, *Esox reticulatus*, &c. By many it is considered a very sweet fish, although it is but seldom brought to market. It is known by the names of “Bream,” “Ruff,” “Pumpkin-seeds,” and “Kivers.”

They build circular nests by removing the weeds from the bottom, and excavating the sand or gravel to so great an extent that they are often two feet in width and a half foot in depth. They are commonly placed near each other, and sometimes in so shallow water that the usual falling of the river in summer will leave them dry. In this way, besides the ordinary chance of falling a prey to the appetite of other fishes, a

large proportion of the species is yearly destroyed. In its care of the nest, it is very assiduous, and at this time it can be not only closely observed, but sometimes even handled, without its deserting its charge.

NEW BRUNSWICK, PERLEY. MASSACHUSETTS, STORER. VERMONT, THOMPSON. CONNECTICUT, AYRES, LINSLEY. NEW HAMPSHIRE, H. R. STORER. NEW YORK, MITCHILL, DEKAY. OHIO, KIRTLAND. KENTUCKY, RAF. THE GREAT CANADIAN LAKES, RICHARDSON.

### POMOTIS APPENDIX, *Dekay*.

#### *The Red-tailed Bream.*

(PLATE III. FIG. 4.)

*Labrus appendix*, *Black-eared Pond-fish*, MITCHILL, Supp. to Amer. Month. Mag., II. p. 247.

*Pomotis appendix*, DEKAY, Report, p. 32.

" " LINSLEY, Cat. of Fishes of Conn.

*Pomotis rubri-cauda*, *Red-tailed Pomotis*, STORER, Bost. Journ. Nat. Hist., IV. p. 177.

" " LINSLEY, Cat. of Fishes of Conn.

*Pomotis appendix*, STORER, Mem. Amer. Acad., New Series, II. p. 294.

" " STORER, Synopsis, p. 42.

*Color.* When alive, of a general rusty brown, or in some specimens golden brown, more strongly marked above the middle of the body by ferruginous spots being densely distributed along the scales; these spots are more sparse and more distinct below the lateral line; the body, beneath and in front of the ventral fins, of a blood-red color; the throat is bluish-white. A bluish-white undulating line runs from the upper jaw just beneath the eye, across the operculum and beneath the opercular membrane to its posterior extremity; a second line of a similar character arises just above this, and, interrupted by the eye, again commences back of it, and passes over the opercular membrane; so that the membranous appendage of the operculum, which is broad, rounded posteriorly, and of a uniform black color, is between these lines. Beneath the undulating lines just spoken of are bluish-white blotches irregularly distributed upon the preoperculum, some of them passing downwards towards its lower edge. Pupils black, irides red. The dorsal fin is anteriorly of a dark-brown color; its posterior membranous portion is red. The ventrals are red at their base and black at extremities. The pectorals are of a yellowish-brown color. The anal is yellowish at its base and fuliginous at its margin. The caudal is of a blood-red color. After death, the body becomes of a bluish-gray color; the abdomen changes to orange; the extremities of the ventrals are purple; and the tail is rust-colored, livid posteriorly.

*Description.* Length of head, including the opercular membrane, equal to about one third the length of the body; greatest depth of fish, exclusive of the dorsal and anal fins, equal to more than one third the length of the body. The head, between

and in front of the eyes, is naked. The eyes are circular; their diameter less than the distance between them. Gape of mouth large. The posterior nostril is the longer. The lateral line commences above, and in front of, the base of the opercular membrane, and assumes the arch of the body.

The dorsal fin commences above the posterior portion of the opercular membrane; its first and second spines are the shortest; the membranous portion is rounded above and posteriorly.

The pectorals are broad and rounded.

The rays of the ventrals are multifid.

The soft portion of the anal is rounded along its entire margin.

The caudal fin is somewhat emarginated.

The fin rays are as follows: — D. 10 to 11 – 9 to 11. P. 11 to 12. V. 1 – 5. A. 3 – 9 to 10. C. 18. Length about six inches.

*Remarks.* The specimens I have seen of this species were sent me from Concord, by Mr. Edward S. Hoar; they were taken with *P. vulgaris*. Although Mitchill, in his description of the *Labrus appendix*, makes no mention of the color of the fins, which is a striking character, it agrees in other particulars so nearly with the species before me, that I cannot but think they are identical; and therefore suppress here, as I have previously done in my Synopsis, my specific name of "*rubri-cauda*."

Massachusetts, STORER. New York, MITCHILL.

The Genus *Sphyræna*, which has usually been included in the Family *Percidæ*, will be introduced hereafter in a different group.

## FAMILY II. TRIGLIDÆ.

Contains a numerous series of fish, to which the singular appearance of their head, variously bristled and covered with armor, gives a peculiar physiognomy. Their general character consists in having the suborbital bone more or less extended over the cheek, and articulated behind with the preoperculum.

### GENUS I. PRIONOTUS, Cuv.

Pectorals very large, with numerous rays. A band of even teeth on the palatines.

*PRIONOTUS LINEATUS, Dekay.**The Banded Gurnard.*

(PLATE V. FIG. 4.)

*Trigla lineata*, Gurnard or Sea-Robin, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., I. p. 430, pl. 4, fig. 4.*Le Prionote striè*, *Prionotus strigatus*, CUV. et VAL., IV. p. 86.*Prionotus strigatus*, Règne Animal, ed. VAL., pl. 20, fig. 2." " *Sea-Robin*, Gurnard, Grunter, STORER, Report, p. 12.

" " AYRES, Bost. Journ. Nat. Hist., IV. p. 258.

" " LINSLEY, Cat. of Fishes of Conn.

*Prionotus lineatus*, Banded Gurnard, DEKAY, Report, p. 45, pl. 4, fig. 12.

" " STORER, Mem. Amer. Acad., New Series, II. p. 302.

" " STORER, Synopsis, p. 50.

*Color.* The recent specimen is of a reddish-brown color above, and the entire surface, including the head, is covered with numerous black dots. The gill-covers and intermaxillaries in some specimens are orange. The dead fish is of a slate-color above the lateral line, with a few black dots irregularly distributed over its surface, the sides are lighter, with a reddish tint; abdomen white. Beneath the lateral line, and parallel to it, runs a broader brownish line, which arises under the humeral spine; this line is broken at its posterior extremity with interrupted points or spots. Beneath the anterior portion of this line are several broken brown bands. The first dorsal fin is of a light reddish tint, with a black blotch upon the upper portion of the membrane between the fourth and fifth, or third, fourth, and fifth rays. The anterior edge of the first three rays barred with black. The second dorsal is reddish. The pectorals are fuliginous beneath and reddish above; fuliginous also in centre of upper portion, with numerous transverse black lines, which are more obvious at the base of the fin. The ventrals are white.

*Description.* Head broader than the body; its length rather less than one third the length of the fish; its depth equal to more than half its length, and made up of seven distinct bony plates, which form a perfect helmet of defence. The whole upper part of the head, the occiput, the space between the eyes, and the portion anterior to the snout, are composed of one plate; this portion is roughened throughout its whole extent by irregular corrugations, and terminates posteriorly in two strong, very acute spines; at the upper anterior and posterior angles of the eyes, minute spines are also observed. This plate is emarginated anteriorly, deeply truncated posteriorly. The operculum is a distinct plate, of an irregularly triangular form, having two spines at its posterior extremity; the lower larger and pointing directly back, the upper pointing obliquely upwards; this plate is covered with elevated striæ radiating from the anterior portion towards the circumference, and is separated from the preopercle by a membrane,

which renders it movable; its margin is bordered by a wide membrane. The preoperculum is rather small and is triangular, slightly movable, and divided at its lower portion by a horizontal, serrated, bony ridge, which terminates posteriorly in a naked spine; beneath this ridge, the inferior portion is corrugated and granulated; from the base of the preopercle, radii diverge to its upper portion. Suborbital bones roughened like the top of the head; cheek-bones covered with elevated striæ, slightly serrated upon their whole lower margin, and strongly serrated anteriorly on each side of the snout. A strong ridge upon the humeral bone, serrated on its under edge, terminating in a naked spine. All the spines upon the head are much more acute in young specimens. In front of the emargination of the frontal bony plate is a naked membranous portion, equal in width to the distance between the eyes; in this space, half way between the eyes and the extremity of the snout, are situated the nostrils, the posterior of which is the larger. Eyes oblong; longest diameter equal to the distance between the eyes. Jaws armed with numerous, small, card-like teeth; upper jaw projecting beyond the lower. Tongue colorless, fleshy. The lateral line arises above the posterior angle of the operculum, and, curving slightly downwards to a line opposite the space between the dorsal fins, thence pursues a straight course to the tail.

The first dorsal fin is situated in a groove which partially receives it when closed, and arises just back of a line with the termination of the occipital spines; it is longer than high. Its first ray is spinous, and serrated upon its entire anterior edge; the second and third rays are serrated at their upper anterior portion; the third and fourth rays are the longest. It is composed of ten spinous rays; the three posterior are exceedingly small, and look like isolated spines, between the fins.

The second dorsal is one third longer than high; its rays are bifid, and their tips slightly project beyond the connecting membrane.

The pectorals are very broad when expanded, and are one third the length of the body. On a line with the base of the pectorals, beneath them, are three fleshy appendages, somewhat similar in their appearance to the fin rays, though larger, and of equal size throughout their entire length; the upper, which is the longest, is equal to half the length of the pectorals.

The ventrals are situated beneath the base of the pectorals; their longest rays are equal to two thirds the length of the pectorals; the connecting membrane is emarginated between the tips of the rays. The first ray is spinous, and shorter than the others.

The anal fin arises back of, and terminates posteriorly to, the second dorsal, which fin it equals in length.

The caudal is composed of stout articulated rays, and is nearly straight at its extremity.

The fin rays are as follows:—D. 9 to 10 – 12 to 13. P. 12 to 13. V. 6. A. 10. C.  $12\frac{4}{5}$ . Length, a foot to 18 inches.

*Remarks.* This pretty species, which is much more common than the *P. Carolinus*, is frequently taken in the Vineyard Sound while fishing for Scapaug (*P. argyrops*), but is not used as an article of food.

Massachusetts, STORER. Connecticut, AYRES. New York, MITCHILL, CUVIER, DEKAY.

PRIONOTUS PALMIPES, *Storer.*

*The Web-fingered Gurnard.*

(PLATE V. FIG. 1.)

*Trigla Carolina*, LIN., p. 528, CUV. et VAL.

*Trigla palmipes*, *Web-fingered Gurnard*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., I. p. 431, pl. 4, fig. 5.

*Le Prionote de la Caroline*, *Prionotus Carolinus*, CUV. et VAL., IV. p. 90.

*Prionotus Carolinus*, *Web-fingered Grunter*, STORER, Report, p. 14.

“ “ AYRES, Bost. Journ. Nat. Hist., IV. p. 258.

“ “ *Web-fingered Gurnard*, DEKAY, N. Y. Report, p. 46, pl. 5, fig. 15.

“ “ LINSLEY, Cat. of Fishes of Conn.

“ “ STORER, Mem. of Amer. Acad., New Series, II. p. 303.

“ “ STORER, Synopsis, p. 51.

*Color.* When first taken, the body above is of a reddish-brown color, with irregular blotches and shadings of a darker brown appearing like indistinct transverse white bands across the dorsum; beneath nearly white. Branchial membrane fuliginous; margined anteriorly and posteriorly with white. The connecting membrane of the first dorsal is transparent, slightly dusky, marked by oblique white lines, and has a large dark-brown spot, the greater portion of which is between the fourth and fifth rays; in young specimens this spot is confined *entirely* to the space between the fourth and fifth spines. The second dorsal is of a dull white color, marked by interrupted longitudinal orange bands. The pectorals are reddish-brown above, slate-colored beneath, with the exception of the two posterior rays, which are white. The pectoral appendages are reddish-brown at their base, and orange at extremities. The ventrals are reddish-white above, white beneath. The anal is of the same general color as the second dorsal.

*Description.* Length of head rather less than one fourth the length of the entire fish; width of head more than half its length. The armature of the head is very similar to that of *P. lineatus*, and yet there are striking differences; the several bones

are less deeply furrowed and ridged, appearing more like shagreen; at the anterior angle of the eye are three distinct spines. The occipital spines are not so acute as in *P. lineatus*, but are the terminations of carinæ in two arrow-shaped plates of bone; in *P. lineatus*, there is a small spine at the posterior angle of the eye; in this species are two elevated ridges which run posteriorly; these ridges are not prominent in the immature fish. Nostrils of moderate size; the anterior the larger. Eyes high up on the head. Sides of snout strongly serrated. Jaws armed with numerous card-like teeth; the upper jaw the longer. The lateral line, arising between the occipital spine and the posterior superior edge of the operculum, is very indistinct throughout its whole course, but more so at its origin, and is continued in a straight line to the middle of the base of the tail.

The first dorsal fin is situated in a deep groove. The whole anterior edge of the first three rays is serrated, and the upper portion of the fourth.

The second dorsal is nearly straight upon its margin.

The pectorals are large, broad, rounded, and about one third the length of the body. Just in front of and beneath the pectorals are three fleshy appendages, widened at extremities; the posterior the largest. The anal commences just back of, and terminates upon the same plane with, the second dorsal.

The caudal is lunated.

The fin rays are as follows: — D. 9 or 10 – 13. P. 13 or 14. V. 6. A. 12. C.  $12\frac{1}{4}$ . Length 15 to 18 inches.

*Remarks.* This species is much more rare than the *P. lineatus*. It was well described by Mitchill, who makes no mention of its infrequency in the waters of New York; but Dekay remarks, that in the course of twenty years he had not met with more than six or eight specimens. As one of its names implies, it is a Southern species. Individuals are not unfrequently taken in the Vineyard Sound, during the entire summer, while fishing for Tautog. It is caught in deeper water than *P. lineatus*. Dr. Yale informed me that he had eaten this species, which, when skinned and boiled, is quite palatable. Occasionally this species is captured north of Cape Cod. In September, 1840, I received from Captain Nathaniel Blanchard of Lynn a specimen twelve inches in length, taken in a net at Green Island; and Henry Sheafe, Esq., of this city, the next year sent the Boston Society of Natural History two specimens which were captured at Phillips's Point, Lynn. I have also seen two or three other individuals in the market, which have been caught in Massachusetts Bay. The specimen here described is the largest of those I had the good fortune to procure while on a visit at Tisbury, in August, 1846. Mr. Ayres, in his enumeration of the Fishes



of Brookhaven, L. I., contained in the fourth volume of the "Boston Journal of Natural History," when speaking of this species, says: "When at rest, they lie on the bottom, with their broad pectorals sometimes spread and sometimes closed; in swimming, however, the pectorals are closed and flat upon the body. If alarmed by the approach of a boat or any other object, they bury themselves so completely in the sand, that a very close observation is necessary to detect them. This concealment is effected by a rapid lateral movement of the body, which displaces the sand from beneath, and causes it to fall upon their sides and back, covering them entirely, except the eyes and top of the head. Probably they often resort to this manœuvre when approached by the large fish which feed upon them."

Massachusetts, STORER. Connecticut, AYRES. New York, MITCHILL, CUVIER, DEKAY. Carolina, CUVIER.

Although this species was supposed by Cuvier to be the *Trigla Carolina* of Linnæus, I am compelled to reject his specific name, as his description is altogether too indefinite to identify the fish. He makes no mention of the characteristic palmation of the pectoral appendages.

### PRIONOTUS PILATUS, *Storer*.

(PLATE VI. FIG. 1.)

*Prionotus pilatus*, STORER, Proceedings of Bost. Soc. of Nat. Hist., II. p. 77, 1845.

" " STORER, Mem. of Amer. Acad., New Series, II. p. 522.

" " STORER, Synopsis, p. 270.

*Color.* Upper part of body a reddish-brown; head a lighter red; body beneath yellowish-white; throat color of pectorals; pectorals dark blue; ventrals color of abdomen. First dorsal fuliginous, crossed by two transverse white lines, one near its base, and the other through its centre; the upper membranous portion between the fourth and fifth rays is marked by a large black blotch. The second dorsal of the same color as the first, with undulating whitish lines crossing the connecting membrane from its base to its margin, presenting a marbled appearance. Anal fin of a dirty white color. Caudal fin colored like the pectorals, but rather lighter.

*Description.* Body oblong, cylindrical. Head one fourth the length of the body; depth of head nearly equal to two thirds its length. Width of snout equal to nearly twice the distance between the eyes. Eyes moderate, oblong, their longest diameter equal to one sixth the length of the head. Nostrils small, nearer to the tip of the snout than to the eyes. Jaws, palatines, and pharyngeals armed with numerous small, card-like teeth. Upper jaw the longer.

The lateral line commences just beneath the occipital spine, and pursues nearly a straight course to the caudal fin.

The first dorsal arises between the posterior projections of the occiput; the first spinous ray is serrated throughout its entire anterior portion; the second is serrated only on its right side; the third only on its left; the remaining rays are smooth; the third and fourth rays are longest. Fin one half as high as long.

The second dorsal rather more than a third as long as the first dorsal; its rays are bifid and slightly projecting at their extremities.

The pectorals when expanded are equal in their depth to one half their length.

Anterior to and beneath the pectorals are three fleshy appendages, tapering at their extremities, the anterior two thirds the height of the posterior.

The longest rays of the ventrals are nearly two thirds as long as the pectorals; the anterior ray is short and spinous, the other rays are multifid at their extremities.

The anal fin commences on a line just back of the second dorsal, and terminates opposite the extremity of that fin.

Caudal fin deeply emarginated; the outer rays projecting beyond the others.

The fin rays are as follows:—D. 10 – 13. P. 13. V. 6. A. 12. C.  $12\frac{1}{4}$ .

I have seen but one specimen of this species, which was taken in Massachusetts Bay. Massachusetts, STORER.

In the "Proceedings of the Boston Society of Natural History," Vol. II. p. 77, I stated that the *Prionotus punctatus* had been found in our waters. Thinking it possible I may have been mistaken, and that the specimen belonging to the Boston Society of Natural History was not taken in Massachusetts Bay, as it was said to have been, I prefer not to admit it in this communication.

## GENUS II. DACTYLOPTERUS, LACÉP.

The rays under the pectorals are numerous and large; and instead of being free, as in the preceding genera, they are united by a membrane into a supernumerary fin, larger than the fish itself, and which supports it in the air for some length of time. The muzzle, which is very short, appears to be cleft like the lips of a hare; the mouth is situated beneath; there are, in the jaws only, certain rounded teeth, arranged like pavement; the head is flat, rectangular, and granulated; the preoperculum is terminated by a long and strong spine. All the scales are carinated.

DACTYLOPTERUS VOLITANS, *Cuv.**The Sea-Swallow.*

(PLATE VI. FIG. 5.)

- Trigla volitans*, *Flying Gurnard*, L., SHAW'S Gen. Zoöl., IV. p. 622, pl. 91.  
*Morcielago*, PARRA, p. 25, pl. 14.  
*Polynemus sex-radiatus*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., I. pl. 4, fig. 10.  
 " " MITCHILL, Supp. Amer. Month. Mag., II. p. 323 (?).  
*Le Dactyloptère commun*, *Dactylopterus volitans*, CUV. et VAL., IV. p. 117.  
*Dactylopterus volitans*, GRIFFITH'S CUV., X. p. 138.  
 " " RICH., Fauna Boreal. Americ., III. p. 40.  
 " " WILSON, Encycl. Brit., art. Ichthyology, p. 173.  
 " " *Sea-Swallow*, DEKAY, Report, p. 49, pl. 17, fig. 46.  
 " " LINSLEY, Cat. of Fishes of Conn.  
 " " STORER, Mem. Amer. Acad., New Series, II. p. 304.  
 " " STORER, Synopsis, p. 52.  
 " " *Bat-fish*, SCHOMBURGK, Hist. of Barbados, p. 667.

*Color.* The specimen now described is of a slate-color above, with indistinct darker blotches; top of head darker than back; upper jaw yellowish-white, with several dark-brown spots beneath the eyes. Abdomen yellow. Dorsal fin white, banded with brown; pectorals dull brown, irregularly spotted with darker blotches, lighter beneath, white at their inferior base; caudal yellowish, transversely banded with black.

My specimen, however, having been preserved in spirits, and its colors consequently being in a great measure destroyed, I shall avail myself of this portion of Dr. Dekay's description: "Light brown above, (darker on the summit of head,) with irregular darker spots. Sides silvery with flesh-color, which latter is predominant beneath. Dorsals gray, with brown spots on the membrane of the first, and the rays of the second annulated alternately with brown and lighter. The posterior pectorals blackish, with bluish iridescent spots; the anterior dark brown varied with black. Ventrals and anal flesh-colored. Caudal light brown, with irregular brownish bands."

*Description.* Body cylindrical anterior to vent; abdomen flattened posterior to vent; sides compressed at posterior extremities. Head flattened above. Back and sides covered with rows of fixed raised scales; the six or eight rows upon the sides are most elevated, sharp with minutely denticulated edges, and their summit with more marked denticulations. There are fifteen rows of scales, passing longitudinally on the sides, between the origin of the second dorsal and the abdomen. Posterior to the second dorsal, these rows are less marked than anterior to it; the rows back of the head and beneath the pectorals are much more numerous than posteriorly; these gradually approximate, and, as it were running into each other, are for the most part lost, so that at the termination of the second dorsal fin there remain but about twelve rows, and at

the fleshy portion of the tail but four; two of these elevated, bounding the edge of the back and abdomen, and the others, much less raised, between them.

The length of the head to the termination of the subscapular spine equal to more than one third the entire length of the fish. Head above bony, very broad, granulated throughout, deeply emarginated behind, concave between the eyes, and terminating posteriorly on each side in very pointed subscapular bones, which have an elevated ridge passing through their centres. Suborbital bones emarginated posteriorly; their posterior superior angle passing upward and backward to the centre of the orbit of the eye; their posterior inferior angle is continued backward in a sharp point to the preoperculum; the inferior edge of this inferior portion is slightly denticulated, the teeth looking forward.

A branch of the preoperculum marked with vertical striæ passes upward above the termination of the posterior superior angle of the suborbital bone; its posterior angle terminates in a long spine, which passes backward to the posterior half of the subscapular bone; this spine is strongly serrated upon its outer edge, denticulated upon its lower edge, and granulated along its base. The operculum small, triangular, scaled. The eyes are large and circular. The nostrils are double, and of nearly equal size; the anterior and inferior is tubular. The mouth is small; the lips are fleshy. The lower jaw is the shorter. Both jaws armed with several rows of small conical teeth; minute teeth exist also in the pharynx. Snout blunted.

Just anterior to the spinous rays of the first dorsal, and higher than they, are two membranous rays opposite to each other and connected at their bases.

The first dorsal is of a triangular form, the posterior rays being higher than the first. This fin, when closed, is received into a groove.

Between the first and second dorsal fins is a short, stout, triangular spine. Directly back of this spine arises the second dorsal, which is quadrangular, and has its rays connected together by an exceedingly delicate membrane. Its six anterior rays are simple.

The pectorals are very broad when expanded; and reach, when closed, the fleshy portion of the caudal fin. The shortest rays are the six which are separated at the anterior portion from the fin, save at the base, where they are connected to it by a membrane. The central rays of this fin are the longest.

The ventrals are beneath the pectorals; their height is about equal to that of the first six rays of the pectorals; the third and fourth rays are the longest.

The anal is situated beneath the second dorsal.

The caudal is deeply concave; with two elevated scales, looking like finlets, approximating each other at its base.

The fin rays are as follows : — D. 2-4-1-8. P. 30-6. V. 1-4. A. 6. C. 10 $\frac{1}{4}$ . Length about 6 inches.

*Remarks.* The accompanying description and figure are prepared from a specimen sent me by Dr. Yale from Holmes's Hole ; it is the only individual I have seen.

This species was very well described by Dr. Mitchill in his supplement to his fishes in "The American Monthly Magazine and Critical Review," and still better by Dekay in his New York Report.

Newfoundland, CUVIER. Massachusetts, STORER. Connecticut, LINSLEY. New York, MITCHILL, DEKAY. Gulf of Mexico, PARRA. Caribbean Sea, CUVIER, SCHOMBURGK.

### GENUS III. COTTUS,\* ARTEDI.

Inhabiting only fresh water. But one small spine at the angle of preoperculum ; sometimes another still smaller, always hidden under the skin and perceptible to the touch only, at the lower margin of the suboperculum. Head very depressed, more or less truncated in front, generally broader than high, but always very uniform, being scarcely detached from the body unless by its more considerable breadth. Second dorsal always higher than first. Ventrals with three or four soft rays. Lateral line usually interrupted.

#### COTTUS GRACILIS, *Heckel.*

#### *The River Bull-head.*

(PLATE IV. FIG. 3.)

*Uranidea quiescens*, *Little Star-gazer*, DEKAY's Report, p. 61, pl. v. fig. 914.

*Cottus gobio*, AYRES, Bost. Journ. Nat. Hist., v. p. 121, pl. xi.

" " STORER, Synopsis, p. 52.

*Cottus gracilis*, HECK., GIRARD, Proceedings of Bost. Soc. Nat. Hist., III. p. 189.

*Color.* Light green mottled with irregular dark-brown blotches, which are larger on the posterior part of the body.

*Description.* Length of the head about one fifth that of the body ; much broader than the body ; flattened above back of the eyes. Preoperculum armed at its posterior superior angle with a sharp spine curving upwards, and below this upon its edge

\* The genus *Cottus* has heretofore been composed of two separate groups, consisting of fluviatile and marine species. Mr. Girard, after having devoted much attention to the subject, has formed from these two distinct genera, and gives as his reason for not accepting Dekay's *Uranidea*, that, according to the principles of nomenclature, *Cottus* must be retained for the fresh-water group, having been at first applied to them. It remains, however, to be seen whether these changes will be accepted by succeeding ichthyologists.

with another very minute spine. Eyes prominent, obliquely oblong. Jaws equal, with numerous exceedingly minute teeth. Gape of mouth moderate.

Lateral line commences at the superior posterior angle of the operculum, and is continued in a straight line to just below the extremity of the second dorsal fin, where it curves, and ends at the centre of the caudal rays.

The first dorsal fin arises just back of the origin of the pectorals; its length is equal to about one third that of the second dorsal.

The second dorsal, which arises directly back of the first, is of equal height throughout, a little higher than the first dorsal, and is of a quadrangular form.

The pectorals are broad, higher than the length of the head.

The ventrals are composed of three rays of nearly equal length, and united at their base.

The anal fin commences back of the second dorsal, and terminates anterior to the termination of that fin.

The caudal fin is about the length of the head, and is straight at its extremity.

The fin rays are as follows: — D. 8–7. P. 14. V. 3. A. 12. C. 12. Length of fish  $2\frac{1}{2}$  inches.

*Remarks.* The individual from which my description has been drawn up was sent me from Shirley, by Dr. C. D. Dowse.

Mr. Horatio R. Storer caught two specimens near the source of the Saco River, in the town of Bartlett, New Hampshire, among the White Mountains, where the water was about three inches deep. When first seen they were lying under little stones, with the head and expanded pectoral fins alone visible, and so motionless that he would have overlooked them, had he not been carefully examining the bottom in search of salamanders. When disturbed, they immediately darted under the stones, and were only secured by cautiously placing the hand before them so that they could not escape, on which they would dart directly into it. On account of their viscid secretion, they are retained by the hand with difficulty.

Massachusetts, STORER. New York, DEKAY. Connecticut, AYRES. New Hampshire, H. R. STORER.

#### GENUS IV. ACANTHOCOTTUS, GIRARD.

Always marine. Spines upon each of the opercular bones. Surface of head and often circumference of orbits either armed with spines, serrated, or notched. Mouth more deeply cleft than in Cottus. Lateral line uninterrupted.

*ACANTHOCOTTUS VARIABILIS, Girard.**The Greenland Sculpin.*

(PLATE IV. FIG 1.)

*Cottus scorpius*, FABRICIUS, Fauna Groenlandica, p. 156, No. 113.*Le Chaboisseau du Groenland*, (*Cottus Groenlandicus*), CUV. et VAL., IV. p. 185.*Cottus Groenlandicus*, *Greenland Bull-head*, RICH., Fauna Boreal. Americ., III. pp. 46 and 297, and admirably figured, pl. 95." " *Greenland Sculpin*, STORER's Report, p. 16." " *Greenland Bull-head*, DEKAY, Report, p. 54, pl. 4, fig. 2.

" " STORER, Mem. Amer. Acad., New Series, II. p. 305.

" " STORER, Synopsis, p. 53.

*Cottus quadricornis*, SABINE, App. to PARRY's First Voyage.*Cottus variabilis*, AYRES, Proc. Bost. Soc. Nat. Hist., I. 1842, p. 69.

" " AYRES, Bost. Journ. Nat. Hist., IV. 1843, p. 259.

*Acanthocottus Groenlandicus*, GIRARD, Proc. Bost. Soc. Nat. Hist., III. p. 185.*Acanthocottus variabilis*, GIRARD, Bost. Journ. Nat. Hist., VI. p. 248.

*Color.* Upper part of the body dark brown, with large clay-colored blotches on the top of the head and upon the gill-covers, with a few smaller ones on the back and sides, and small circular yellow spots on the sides towards the abdomen. Large perfectly white ocelli upon the abdomen, beneath the pectorals. Abdomen yellow tinged with red, throat of a dull white color. The first dorsal fin of a dark-brown color, variegated with yellow; the second dorsal is brown, with several transverse yellowish bands; the pectorals are marked with irregular transverse brown bands and yellow spots; the rays of this fin are orange-colored; the ventrals are white, with three transverse dark-brown bars; the anal is marked like the second dorsal; the rays of the caudal are black, while their connecting membrane is yellowish.

*Description.* Body oblong; very stout anteriorly; tapering towards the tail.

The sides, both above and beneath the lateral line, are roughened by granulated tubercles which feel like spines when the finger is drawn towards the head.

The length of the head, measured to the posterior extremity of the occiput, is equal to about one fourth the length of the body; its width across the occiput equal to its length; its greatest depth equal to two thirds its length. The head is armed with several spines; those upon its top are blunted, those on the gill-covers are longer, with projecting, sharp points. The nasal spines are sharp and recurved; at the posterior superior angle of the eye is a strong, slightly recurved, short spine, stouter than the nasal spine. Upon the occiput are also situated two strong, blunt, and somewhat recurved spines; between these and the former is a quadrangular depression. The preoperculum has three spines, naked at their extremities, two of which are situated at its superior angle; the upper of these spines is much the largest, and points upwards; the second is smaller and nearly straight; the third and smallest, at its inferior angle, points directly downwards. The operculum

is armed with two spines ; the larger at its superior angle ; the second, much the smaller, at its inferior angle.

Eyes circular, their diameter equal to one sixth the length of the head. The gape of the mouth very large ; the distance between the tips of the jaws, when distended, is equal to one third the length of the head ; the upper jaw the longer ; both jaws are armed with numerous, very small, card-like teeth ; similar teeth on the vomer and pharyngeals. Nostrils tubular, just in front of the eyes.

The first dorsal fin commences on a line above the pectorals ; it is rounded above, about as long again as high.

The second dorsal commences at the termination of the first ; appearing almost to be united with it.

The pectorals are very broad when expanded ; their length at base is less than the height of the first rays ; roughened granulations may be perceived beneath several of the rays of these fins ; the inferior rays are much the shorter and stouter.

The outer ray of the ventrals is very stout.

The anal commences just posterior to the second dorsal, and is shorter than that fin.

The caudal stout, with the rays bifurcated at their posterior extremities.

The fin rays are as follows :—D. 9 or 10 – 16 or 18. P. 17. V. 3. A. 13. C. 12½. Length about a foot.

*Remarks.* In a monograph of the Genus *Cottus*, which he published in the "Proceedings of the Boston Society of Natural History," Vol. III., Mr. Charles Girard considered the *Cottus variabilis* of Ayres as the young of the *Groenlandicus*. At a subsequent period, having received from Mr. Horatio R. Storer a species of *Cottus* from Labrador, he was enabled to decide that it was not the same as the species on our coast which is known as the *Groenlandicus*, and consequently has retained Ayres's specific name for the Massachusetts fish. So that what has been known by us as the *Groenlandicus* is now to be called *variabilis*, and the fish so called by Ayres is the young.

This beautiful fish is much less common than the *Virginianus*. Though the other species is said to be a favorite food of the Greenlanders, this is not used with us. It is frequently seen swimming upon the sandy bottoms of the numerous small coves of Massachusetts Bay, and is taken with the hook while fishing from the rocks for the Conner. Specimens of the young of this species were presented to me by Mr. Desor, who procured them at the South Shoals, fifteen miles from Nantucket, with the dredge, in eleven and a half, fifteen, and eighteen fathoms of water respectively, from a bottom abounding with barnacles and membranipora. It is exceedingly voracious, devouring all kinds of Crustacea, Mollusks, and Echini. In the stomach of one I found



three entire specimens of the *Portunus pictus* of considerable size; in others I have seen large quantities of the *Echinus granulatus*, and several species of Algæ.

Maine, Massachusetts, STORER. Connecticut, AYRES. New York, DEKAY.

### ACANTHOCOTTUS VIRGINIANUS, Girard.

#### *The Common Sculpin.*

(PLATE IV. FIG. 2.)

*Scorpius Virginianus*, WILLOUGHBY, Hist. Pisc., App., p. 25, pl. 10, fig. 15 (?).

*Cottus octodecimspinosus*, *Eighteen-spined Cottus*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., I. p. 380.

*Le grand Chaboisseau à dix-huit épines de l'Amérique du Nord*, *Cottus octodecimspinosus*, CUV. et VAL., IV. p. 181.

*Cottus octodecimspinosus*, *Sculpin*, RICH., Fauna Boreal. Americ., III. p. 46.

" " GRIFFITH'S CUV., x. pl. 43, fig. 4.

*Cottus Virginianus*, *Common Sculpin*, STORER, Report, p. 18.

" " *Common Bull-head*, DEKAY, Report, p. 51, pl. 5, fig. 13.

" " LINSLEY, Cat. of Fishes of Conn.

" " STORER, Mem. Amer. Acad., New Series, II. p. 305.

" " STORER, Synopsis, p. 53.

*Acanthocottus Virginianus*, GIRARD, Proc. Bost. Soc. Nat. Hist., III. p. 187.

" " H. R. STORER, Bost. Journ. Nat. Hist., VI. p. 250.

*Color.* While alive, some individuals of this species are of a greenish-yellow color, with four transverse dark-brown bars, which extend from the dorsum to the lower part of the sides; the anterior of these is nearly as wide at its base as the first dorsal fin at which it commences; the second is situated at the anterior half of the second dorsal; the third, which is narrower than the second, is at the posterior half of the second dorsal; the fourth band crosses the fleshy portion of the tail. In others the general color is of a greenish-brown, the bands are very indistinct and appear rather like large blotches. Abdomen white. The first dorsal is fuliginous, and crossed by distinct dark-brown bands. The second dorsal is crossed by three longitudinal bands of dark brown. The pectorals are of a light-yellow color; broad when expanded; the inferior rays are flesh-colored; these fins are crossed by six dark-brown concentric bands of different widths. The ventrals are yellowish-white; the intermediate membrane clouded by indistinct bands of dark brown. The anal is yellowish, crossed by indistinct dark bands. The caudal is yellowish-white, with five very distinct bands. Pupils bluish; irides reddish, with a coppery hue when alive.

*Description.* Length of head equal to one third the length of body; its greatest width equal to two thirds its length. Twenty spines are seen upon and about the head, ten on each side; all these are naked at their extremities. The nasal spines are small and recurved; the post-orbital spines are a little longer than the nasals; they are barely elevated above the top of the head, and point directly backwards; the occipital spines are erect and slightly recurved; they are rather stouter than the post-orbitals;

three spines are situated upon the preoperculum; that at the posterior angle is the largest of any upon the head; it is very stout, is naked throughout its greatest extent, and is partially covered by a loose membrane as a mere sheath, which is readily recurved to its very base; this spine extends backwards nearly to, and in some specimens as far as, and I have seen it continued even beyond, the posterior extremity of the opercular spine. Directly under the base of this spine is situated a second very small one, pointing obliquely backwards and downwards; at the inferior angle of the preopercle is a third spine, pointing downwards and forwards. Two spines are seen upon the operculum; the larger passes from its upper anterior portion to the posterior angle, pointing obliquely backwards; the other, which is quite small, is at the inferior angle, and points directly downwards. Just above the origin of the pectorals is a strong scapular spine, directed upwards and backwards. And above the commencement of the posterior fleshy membrane of the operculum is seen the humeral spine, which is but little longer than the occipital spines.

The head is flattened above and furrowed by ridges which are the continuations of the spines; a slight ridge passes from the nasal spines backwards to the eyes; another extends from the post-orbital to the occipital spines, and exterior to this is another ridge; the whole upper portion of the head is dotted with minute granulations. The gape of the mouth is large; the jaws, pharynx, and palatine-bones are armed with numerous sharp, compact teeth, like those of a card; the upper jaw is the larger. The eyes are very large and prominent. The nostrils are small; the posterior is just back of the nasal spine; the anterior is tubular, and on a line with the base of the nasal spine exterior to it. The lateral line is very prominent, resembling an interrupted series of tubercles. It commences at the scapular spine, and is continued to the caudal rays, being much less marked at its posterior extremity.

The first dorsal fin, which is composed of nine spinous rays, is longer than high. The third ray is the longest; the first ray is about half the height of the second; the extremities of the first six rays project beyond the connecting membrane. Dr. Dekay, in speaking of this fin, says, "the second ray longest." He omits mentioning the first very short ray; and it does not appear in his figure.

The second dorsal arises just back of the first, at the termination of a membrane extending from the first dorsal. It is nearly as long again as the first dorsal; its rays are articulated.

The pectorals are large and rounded.

The ventrals arise beneath the lower rays of the pectorals; simple. Rays free at extremities; first ray quite strong.

The anal commences back of the second dorsal, and is shorter than that fin.

The caudal is even at extremity.

In some specimens the membrane connecting the rays of the second dorsal, anal, and caudal fins extends to their extremities, causing the fins to appear even at their edges; while in others the extremities of the rays project like those of the pectorals and ventrals.

The fin rays are as follows:—D. 9 – 16. P. 17. V. 3. A. 14. C. 12. Length 10 to 18 inches.

*Remarks.* This is our most common species of *Cottus*. As the “Sculpin” or “Toad-fish” it is well known, and is the pest of the numerous boys and idlers who at certain seasons of the year are constantly fishing from the wharves and bridges for more marketable species.

Mitchill described this species in his “Fishes of New York,” under the name of *octodecimspinosus*; but as it has the same number of spines as the *Cottus scorpius*, its specific name alone cannot distinguish it; and as it was previously called by Willoughby *Virginianus*, from a specimen sent him by Lister from Virginia, I have no hesitation in prefixing his specific name to my description.

Newfoundland, RICHARDSON. Massachusetts, STORER. New York, MITCHILL, DEKAY. Virginia, WILLOUGHBY. Labrador, H. R. STORER. New Brunswick and Nova Scotia, PERLEY.

The *Acanthocottus æneus* I now omit, thinking I have previously mistaken for it a variety of *A. variabilis* of Girard.

#### GENUS V. BOLEOSOMA, DEKAY.

The form of the body is that of a dart; the head is very short, rounded like an arc of a circle, below which the mouth, generally small and slightly protractile, opens horizontally; the upper jaw sloping over the lower. The neck and the sides of the skull compressed. The opercular apparatus and the cheeks covered with scales.

#### BOLEOSOMA OLMSTEDI, *Agassiz*.

##### *The Tessellated Darter.*

(PLATE IV. FIG. 4.)

*Etheostoma Olmstedii*, STORER, Bost. Journ. Nat. Hist., iv. p. 61, pl. 5, fig. 2.

“ “ AYRES, Bost. Journ. Nat. Hist., iv. p. 257.

*Percina minima*, HALD., Journ. Acad. Nat. Sci., viii. p. 330.

*Boleosoma tessellatum*, *Tessellated Darter*, DEKAY, N. Y. Report, p. 20, pl. 20, fig. 57.

*Perca minima*, DEKAY, N. Y. Report, p. 7.

*Etheostoma Olmstedii*, *Ground-fish*, LINSLEY, Cat. of Fishes of Conn.

" " STORER, Mem. of Amer. Acad., New Series, II. p. 271

" " STORER, Synopsis, p. 19.

*Boleosoma Olmstedii*, AGASSIZ, Lake Superior, p. 304.

*Color.* Yellowish-green, with blackish blotches upon the sides like interrupted bands. A large dark-brown blotch is seen upon the occiput, and back of this, upon the dorsum, six broad similarly colored transverse bands; the first, just over the pectorals; the second, at the anterior portion of the first dorsal; the third, between the first and second dorsal; the fourth, at the middle of the second dorsal; the fifth, at the termination of the second dorsal; and the sixth, at the base of the tail. These bands all usually disappear at death. Pupils black, irides golden. A narrow deep-black band runs from the tip of the upper jaw to the anterior superior angle of the eye, and a second band passes upwards from the lower anterior angle of the preoperculum to the middle of the lower edge of the eye, and thence to the upper edge of the orbit, interrupted by the globe of the eye. The preoperculum is golden. The first dorsal is almost colorless; the rays of the second dorsal, as well as those of the pectorals, ventrals, and caudal, are elegantly crossed transversely by reddish lines.

*Description.* Form cylindrical. The head is less than one sixth the length of the body; it is flattened above, between, and back of the eyes. The operculum is scaly above, and terminates posteriorly in a sharp spine. Jaws furnished with very minute teeth. The orbits of the eyes are very prominent.

The first dorsal fin commences some distance back of the opercular spine; it is rounded posteriorly.

The second dorsal, of a quadrangular form, commences just posterior to the first; the extremities of its rays bifurcated.

The pectorals are situated just back of the posterior portion of the opercula. Their length is equal to one fifth their height.

The ventrals are situated just back of the base of the pectorals.

The anal arises just posterior to the commencement of the second dorsal; it is rounded at its extremity.

The caudal is slightly emarginated.

The fin rays are as follows: — D. 9 – 13. P. 15. V. 6. A. 11. C. 15. Length three inches.

*Remarks.* This species is not uncommon in the small streams of the western portion of the State.

Massachusetts, STORER. Connecticut, OLMSTED, AYRES. New York, DEKAY. Pennsylvania, HALDEMAN.

## GENUS VI. ASPIDOPHORUS, LACÉP.

Body octagonal, covered with scaly plates; head thicker than the body, with points and depressions above, flattened below; teeth in both jaws only, none on the vomer; snout with recurved spines; branchiostegous rays, six; body tapering to the tail; one or two dorsal fins distinct.

## ASPIDOPHORUS MONOPTERYGIUS, Cuv.

*The Aspidophore.*

(PLATE VIII. FIG. 1.)

*Cottus monopterygius*, BLOCH, 178." " *Single-finned Bull-head*, SHAW, Gen. Zoöl., IV. p. 265.*L'Aspidophore à une seule dorsale*, AGONUS *monopterygius*, BL., SCHN.*Aspidophoroide Tranquebar*, LACÉP., CUV. et VAL., IV. p. 224; VI. p. 554.*Cottus (Aspidophorus) monopterygius*, CUV., *Aspidophore with one dorsal*, RICH., Fauna Boreal. Americ., III. p. 50.*Aspidophoroides monopterygius*, Bull-head, STORER, Report, p. 22, pl. 1, fig. 1.

" " CUV., Règne Animal, ed. VAL., pl. 21, fig. 3.

*Aspidophorus monopterygius*, *American Aspidophore*, DEKAY, Report, p. 62, pl. 2, fig. 6.

" " STORER, Mem. Amer. Acad., New Series, II. p. 309.

" " STORER, Synopsis, p. 57.

*Color.* Above, a light brown, with six indistinct transverse black bands extending from the head to the tail; those upon the anterior portion of the body the broader. Beneath lighter.

*Description.* Body elongated, gradually tapering to the tail; divided longitudinally by eight rows of scaly plates. Those which are situated just back of the head are much the largest. Above, from just back of the eyes to the dorsal fin, are two rows of these plates; two rows on each side for some distance, and two rows beneath; making the fish anterior to the dorsal fin octagonal, and posterior to that fin, hexagonal. The angles of the large scales upon the back form prominent ridges, and between them is thus formed a groove, which extends from the snout between the orbits of the eyes to the posterior extremity of the dorsal fin. Back of this fin is seen a dorsal ridge, instead of the furrow, which is continued to the tail.

The length of the head is equal to about one seventh the entire length of the body; width of head less than that of body. The whole head is bony; the eyes are very large; the orbitar bones prominent. The snout has two recurved spines at its extremity, and a third and smaller one back of them, curving forwards. Mouth small; numerous minute teeth are observed in both jaws.

The dorsal fin is situated upon the posterior half of the body, at the extreme portion of the dorsal furrow.

In this specimen, as well also as in those I previously examined, it is almost impossible to make out the number of fin rays; but the following, if not perfectly accurate, is a near approximation:—D. 5. P. 10. V. 4. A. 4. C. 16. Length 5 inches.

*Remarks.* This species was first described by Bloch as the *Cottus monopterygius*, and afterwards more minutely by Cuvier as the *Aspidophorus monopterygius*, in the fourth volume of the “Histoire Naturelle des Poissons.” Lacépède formed the genus *Aspidophoroides* to receive the species above described, it being the only known *Aspidophorus* with a single dorsal fin. At the time this genus was formed, the species of which we have been speaking was supposed to have been brought from the East Indies. Cuvier, however, in his description, says he has not received it from the East Indies in any of his numerous collections from that quarter of the world; and finally, Richardson, in his “Fauna Boreali Americana,” observed, “that it has lately been discovered to be an inhabitant of the Greenland seas, so that this sub-genus belongs entirely to the Northern hemisphere, and chiefly to the higher latitudes.” Early in May, 1838, Mr. Jonathan Johnston, Jr., sent me three specimens of this species, which he had taken from the stomachs of haddock just caught within two miles of Nahant. They were each more or less mutilated; from one of them, however, my friend Jeffries Wyman, M. D., was enabled to sketch the plate contained in my “Report on the Ichthyology of Massachusetts.” In 1848, Captain Nathaniel E. Atwood sent me a specimen taken from a cod’s mouth at Provincetown. This specimen, although somewhat injured when received, has furnished me with the accompanying figures, and given me an opportunity to revise my former description. Besides the specimens above referred to, Mr. William O. Ayres procured two others, in February, 1851, from the stomach of a halibut taken at Cape Cod; and Mr. Stimpson one in May, from the stomach of a haddock caught in Boston Bay. These are the only individuals I have ever known to be taken south of Greenland.

Massachusetts, STORER. Greenland, RICHARDSON.

#### GENUS VII. CRYPTACANTHODES, NOBIS.

Body elongated, very much compressed, and gradually tapering to the tail. Destitute of scales. Head broad, with no projecting spines; the scapular and humeral spines, and the inferior edge of the preoperculum, prominent to the touch. Numerous depressions in frontal, suborbital, inferior maxillary, and preopercular bones; branchiostegous rays, seven; mouth oblique; a single dorsal fin, composed of strong spinous

rays enveloped by a common membrane, runs nearly the entire length of the fish, and unites, as well as the anal, with the tail. No ventral fins.

C. MACULATUS, *Nobis*.

*Spotted Wry-mouth.*

(PLATE VIII. FIG. 6.)

*Cryptacanthodes maculatus*, *Spotted Wry-mouth*, STORER, Report, p. 28.

“ “ DEKAY, Report, p. 63, pl. 18, fig. 50.

“ “ LINSLEY, Cat. of Fishes of Conn.

“ “ STORER, Mem. Amer. Acad., New Series, II. p. 310.

“ “ STORER, Synopsis, p. 58.

“ “ H. R. STORER, Bost. Journ. Nat. Hist., VI. p. 254.

*Color.* Body a dark reddish-brown tinged with violet. Abdomen and throat a dirty grayish-white. A row or two of moderate-sized dark-brown blotches above the lateral line, and another row immediately beneath it, extend throughout the greater part of its length to the tail. Tip and sides of head, snout, and anterior portion of under side of lower jaw, marked with smaller spots of the same color as those on the sides. Pupils black; irides golden.

*Description.* Length of head about one sixth the entire length; greatest breadth about one half the length of the head. On each side of top of head, two prominent bony ridges run directly back from posterior angle of eye to occiput. The posterior angles of operculum and preoperculum; the lower edge of preopercle; the scapular bones, — all seem like sharp points and edges concealed by the skin. The operculum is large and triangular, covered by the skin, as is also the preoperculum, which presents to the touch two sensible carinæ. Eyes circular, deeply sunk in the projecting orbits; diameter of orbit about equal to distance between eyes. Nostrils tubular, situated on the side of the prominent snout, just at the edge of the intermaxillary bones. Lips fleshy; lower jaw projecting beyond the upper; mouth slanting obliquely downwards; numerous teeth in jaws and upon the vomer and palatine bones, — those on the back part of the jaws recurved, while those in front are smaller and nearly straight. Gape of mouth moderate. Branchiostegal membrane extended along and connected with the sides for a short distance. Lateral line straight and interrupted.

The dorsal fin arises above the posterior half of the pectorals, and is continued to and united with the caudal; all its rays are spinous and strong, concealed by a stout and fleshy membrane; the first few rays are shortest.

The pectorals arise beneath the membrane of the branchiæ; they are fleshy, small, and rounded.

The anal arises upon the anterior half of body ; it is similar in its form and the character of its rays and their enveloping membrane to the dorsal, and is also, like that fin, connected with the caudal.

The caudal is rounded, and appears like the prolongation of the dorsal and anal fins.

D. 78. P. 15. A. 50. C. 15. Length three feet.

*Remarks.* This is a very rare species. I have known of only seven individuals being taken. One of these Mr. Jonathan Johnson, Jr. sent me from Nahant ; one was found by Dr. Henry Bryant of this city, at Commercial Point, Dorchester ; one I received from Captain Atwood of Provincetown ; three of the remainder were said to have been taken in Massachusetts Bay ; and the last was found by Horatio R. Storer on a beach in Nova Scotia. The finest specimen, taken by Captain Atwood, has served for the above description.

#### GENUS VIII. HEMITRIPTERUS, Cuv.

The head depressed ; two dorsals, as in *Cottus* ; no regular scales on the skin, but teeth in the palates. The head is bristly and spinous, and has several cutaneous appendages. The first dorsal is deeply emarginate, a circumstance which has led some authors to believe there were three dorsal fins.

#### HEMITRIPTERUS ACADIANUS, Storer.

##### *The Deep-water Sculpin.*

(PLATE VII. FIG. 4.)

*Cottus Acadianus*, *Acadian Bull-head*, PENN., Arc. Zoöl., II. p. 118.

*Scorpana flava*, *Yellow Scorpana*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., I. p. 382, pl. 2, fig. 8.

*Scorpana purpurea* et *S. rufa*, MITCHILL, Amer. Month. Mag., II. p. 245.

*L'Hemitriptère de l'Amérique*, *Hemitripterus Americanus*, CUV. et VAL., IV. p. 268, pl. 84.

*Hemitripterus Americanus*, RICH., Fauna Boreal. Americ., III. p. 50.

" " Règne Animal, ed. VAL., pl. 22, fig. 1.

" " GRIFFITH'S CUV., X. p. 141, pl. 53, fig. 3.

" " *Sea-Raven*, *Deep-water Sculpin*, STORER, Report, p. 23.

" " *American Sea-Raven*, DEKAY, Report, p. 56, pl. 6, fig. 16.

" " LINSLEY, Cat. of Fishes of Conn.

" " STORER, Mem. Amer. Acad., New Series, II. p. 310.

" " STORER, Synopsis, p. 58.

*Color.* Varies exceedingly. Some specimens are of a deep blood-red ; others of a pinkish-purple ; while others still are of a yellowish-brown, darker on the back ; each, however, variegated on the head, sides, and fins with irregularly defined markings. Abdomen yellow. A large female, weighing five pounds and measuring twenty-six



inches in length, had the whole upper part of the body of a dark brown, elegantly variegated with white and dark-brown markings; this appearance most striking upon the head, about the eyes, and along the upper jaw; it is also observable beneath the chin and lower jaw. The branchial rays, as also the rays of the dorsal, pectoral, and caudal fins, marked with transverse white lines, and the intervening membranes very minutely dotted with black. Abdomen white. In still another specimen of a reddish-brown color, transverse broad bands of sub-quadrangular form were noticeable upon the back; one of these occupied the space between the first and fifth dorsal rays; a second commenced at the seventh ray, and was continued to the fourteenth; a third, between the fifteenth and sixteenth rays; a fourth, between the eighteenth and twenty-second; and a fifth, from the twenty-sixth to the twenty-eighth; in the intervening spaces was a whitish marking beautifully edged with black. The orbits of the eyes were marked with white vertical lines. Pupils black; irides yellowish-brown.

*Description.* Body oblong, cylindrical. Surface granulated, and studded with innumerable tubercles, which are quite large upon the back, and very small or almost entirely disappearing beneath the lateral line. Head large, spinous, hideous in appearance. The length of the head, measuring to the posterior extremity of the operculum, is about one fourth the entire length; width of head across opercula equal to its length. Twelve more or less prominent, blunted, spinous tubercles on each side of the median line of the head; the sharpest-pointed, which in some instances is naked, is just back of the nostril; the largest are at the posterior angles of the eyes, and just in front of the dorsal fin. From several of these prominences, such as those at the anterior and posterior angles of the eyes and about the snout, are suspended fleshy digitated cirrhi; those hanging over the eyes appear like a broad fringe. Orbital cavity large. Eyes moderate in size; the distance between the posterior superior angles of the eyes rather less than one fourth the length of the head; space between them deeply depressed. The suborbital bone presents an irregularly elevated ridge. The preoperculum at its posterior angle is armed with two strong spines; the upper curves upwards and backwards; the inferior is directed backwards and downwards. The operculum is small, triangular, with an elevated longitudinal ridge at its superior part. The jaws are of equal length; from the edge of the lower jaw are suspended about a dozen fleshy prolongations, similar to those attached to the prominences upon the head, but considerably larger. Mouth very large. The teeth in the jaws, pharynx, upon the vomer and palatine bones, numerous, sharp, and recurved like those of a card. The lateral line, which is tubercular, commences just above the posterior angle of the operculum, and, curving with the body, terminates at the base of the caudal rays.

The first dorsal fin arises just back of the posterior spines of the head. The first three rays of this fin are longest; the seventh, eighth, ninth, and tenth rays are next in length; from the extremities of the rays are suspended delicate tentacula.

Just back of the first dorsal arises the second, appearing as if connected with it; and hence described by Mitchill as *one* fin. It is of a somewhat quadrangular form, rounded above when expanded, and having the extremities of the rays projecting beyond the connecting membrane. Height of the fin one third of its length.

The pectorals are very large; when expanded resembling a wing. The rays are uncommonly distinct; the eight anterior are stout and unequal in their length, the anterior one being much the shorter; the ten posterior are rounded posteriorly when expanded; the four anterior of these latter, the larger. These fins arise from the entire lower edge of the branchial aperture; their height to their length is as four to two and a half.

The ventrals arise just back of the first rays of the pectorals. They are composed of three rays, the first of which is shorter and much stouter than the second. In some specimens, however, the first ray is the longest of the three.

The anal commences and terminates on the same plane with the second dorsal. The first nine rays of this fin are deeply divided at their extremities. This is much more marked in some specimens than in others. The length is to the height as three and a half to one and a half.

The length of the caudal is two thirds of its height.

The fin rays are as follows:—D. 16–13. P. 18. V. 3. A. 15. C. 12 $\frac{3}{4}$ . Length two feet.

*Remarks.* This species is frequently taken by the cod-fishermen in deep water in the neighborhood of ledges in Massachusetts Bay.

Nova Scotia and Gulf of St. Lawrence, CUVIER, RICHARDSON. Maine, Massachusetts, STORER. Connecticut, LINSLEY. New York, MITCHILL, DEKAY.

Inasmuch as authors generally suppose this to be the *Acadianus* of Pennant, I am compelled to assume his specific name. It is to be regretted, however, that his description should have been so meagre; and that, while he described well enough the dorsal fins, he should have utterly neglected mentioning the characteristic cirri of the head; this can only be accounted for upon the supposition that he never saw a recent specimen.

## GENUS IX. SEBASTES, Cuv.

Body oblong, compressed, covered with scales; all the upper parts of the head also covered with scales. Eyes large; preoperculum and operculum ending in three or more spines; branchiostegous rays, seven; teeth small, numerous, equal in size, placed on both jaws, the vomer, and palatine bones; a single dorsal fin, partly spinous, partly flexible; inferior rays of the pectoral fin simple.

## SEBASTES NORVEGICUS, Cuv.

*The Norway Haddock.*

(PLATE VII. FIG. 1.)

*Perca Norvegica*, FAB., Fauna Groenl., p. 167.*Perca marina*, Sea-Perch, PENN., Brit. Zool., p. 226.*Serranus Norvegicus*, FLEM., Brit. An., p. 212, sp. 140.*Scorpena Norvegica*, Northern *Sebastes*, JEN., Brit. Vert., p. 347.*Sebastes Norvegicus*, GRIFFITH'S CUV., x. p. 144.*La Sébaste septentrionale*, *Sebastes Norvegicus*, CUV. et VAL., IV. p. 327, pl. 87.*Scorpena* (*Sebastes*) *Norvegica*, Northern *Sebastes*, RICH., Fauna Boreal. Americ., III. p. 52.*Sebastes Norvegicus*, Bergylt, *Norway Haddock*, YARRELL, Brit. Fishes (2d edit.), I. p. 87." " *Norway Haddock*, Rose-fish, Hemdurgan Snapper, STORER, Report, p. 26." " *Northern Sebastes*, DEKAY, Report, p. 60, pl. 4, fig. 11.

" " STORER, Mem. Amer. Acad., New Series, II. p. 312.

" " STORER, Synopsis, p. 60.

*Color.* In the recent fish the entire body, together with the fins, is of a beautiful bright red, with the exception of a black blotch upon the posterior portion of the operculum. After death the color partially disappears upon the throat and abdomen, and the space beneath the ventrals becomes nearly white; and at the posterior base of the soft portion of the dorsal a dull blotch is observed. Pupils black; irides yellow.

*Description.* Body oblong, compressed, covered with small rough scales. Length of the head, from the tip of lower jaws when closed, to the posterior angle of the operculum, about one third the entire length; head flattened above, between the eyes and upon the occiput. The operculum is armed with three spines; one pointing upwards and backwards at its posterior superior angle; a second beneath this, directed obliquely backwards and downwards; and a third, much smaller, at its inferior angle. The preoperculum is rounded at its edge, and furnished with five spinous processes; the three posterior of which are the larger. Two spines upon the scapular bones, and two upon the suborbitals. Four spinous projections upon the supra-orbitals, all of which are pointed backwards; one at the upper anterior angle of the eye; a second with its base continued along the greater portion of the ridge; and two smaller ones behind.

Two elevated sharp ridges upon the occiput, which bifurcate posteriorly into spinous points. Eyes circular, very large; the diameter of the orbit nearly equal to one third the length of the head, when the jaws are closed; the distance between the eyes equal to five eighths the diameter of the eye. The nostrils are just in front of the eyes; the posterior is much the larger. The jaws, pharynx, vomer, and palatine bones are armed with numerous minute, sharp teeth; the upper jaw is very protractile, and has an emargination at its centre, into which the extremity of the lower jaw shuts, when the mouth is closed. The chin is prominent. The lateral line arises above the operculum, and, taking the curve of the body, terminates at the caudal rays; about thirty-six tubes are seen in the course of the line, which are more nearly approximated at the posterior portion of the body.

The dorsal fin commences on a line with the upper opercular spine. Its anterior half is composed of spinous rays; the length of its highest rays is equal to about one third the length of the fin; the connecting membrane does not extend to the summit of the rays, and they are thus left naked and projecting. The posterior half of this fin is composed of membranous rays which are higher than the spinous ones; the length of this portion, which is rounded above and posteriorly, is less than one half the length of the spinous portion.

The pectorals commence on a line with the third dorsal ray; they are rounded when expanded. The rays project beyond the connecting membrane; the length of these fins is equal to one third their height; the middle rays are the longest.

The ventrals are fan-shaped, and situated just back of the pectorals; their first ray is a strong spine; the second membranous ray is the longest.

The anal has three strong spines; the posterior the longest. The first membranous ray is equal to the length of the fin.

The caudal is slightly emarginated at its tip; its length less than one third its height.

The fin rays are as follows:—D. 15–15. P. 18. V. 1–5. A. 3–7. C. 19. Length one foot.

In the specimens I have seen, the preopercular and opercular spines are much more developed than they appear in Cuvier's figure of this species. Yarrell's and Dekay's figures are copies from that of Cuvier.

*Remarks.* This species is known to our fishermen by the names of "Rose-fish," "Hemdurgan," and "Snapper." It is not common in Massachusetts Bay; it is occasionally taken during the winter, and rarely in the summer, while fishing for cod, near shoal ledges contiguous to deep water. It is not a marketable fish with us, although

it is freely eaten by the Norwegians. Captain Atwood informs me that he never saw a specimen of this fish on the southern shore of Massachusetts Bay. The fishermen have an erroneous opinion that the spines of this species are very poisonous. It weighs from one to five pounds.

Greenland, FABRICIUS. Gulf of St. Lawrence, RICHARDSON. Maine, WOOD. Massachusetts, STORER. New York, DEKAY.

#### GENUS X. GASTEROSTEUS, Cuv.

Body without scales, more or less plated on the sides; one dorsal fin with free spines. Ventral fin with one strong spine, and no other rays; bones of the pelvis forming a shield, pointed behind; branchiostegous rays three.

#### GASTEROSTEUS BIACULEATUS, *Mitchill*.

##### *The Two-spined Stickleback.*

(PLATE VIII. FIG. 2, 3.)

*Gasterosteus biaculeatus*, *Two-spined Stickleback*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., i. p. 430, pl. 1, fig. 10.

"	"	"	"	DEKAY, Report, p. 65, pl. 3, fig. 8.
"	"	"	"	STORER, Mem. of Amer. Acad., New Series, II. p. 314.
"	"	"	"	STORER, Synopsis, p. 62.
"	"	"	"	H. R. STORER, Bost. Journ. Nat. Hist., VI. p. 260.

*Color.* The living fish is of an olive-green color above, lighter upon the sides, silvery beneath. Gill-covers silvery, spotted with fuliginous. Pupils black; irides silvery. Fins colorless; in the dead specimens yellowish.

*Description.* Body oblong, compressed, becoming abruptly very slender at the base of the tail. On each side of the body are about thirty transverse horny plates, the posterior of which are the narrower; these plates are indistinctly striated. The lateral line is situated high up on the back; it takes the curve of the body, and is lost in the carina on the side of the tail. The head is less than one fourth the length of the body; above it is bony and granulated, as in the *Prionoti*, and flattened. The mouth is protractile. The jaws are equal, and furnished with numerous minute teeth. The eyes are large and circular. The nostrils are large, and situated about half way between the eye and the snout. The opercula are covered with radiating striæ, as in the *Syngnathi*. A broad silvery plate bounds the branchial orifice posteriorly. On each side of the base of the tail is a distinct membranous carina. There are two distinct spines of about equal size situated upon the dorsum anterior to the dorsal fin; these spines are broad at their base, strongly serrated on their sides, very acute at their extremity,

slightly recurved, and capable of being elevated or depressed at the will of the fish ; the anterior of these is situated over the silvery plate back of the branchial orifice ; the posterior is above the middle of the pectorals. Just anterior to the origin of the dorsal fin, and almost connected with it, is another very minute spine, which is naked throughout the greater portion of its extent.

The dorsal fin is longer than high ; its posterior rays are very short.

The pectorals are elongated, broad, and fan-shaped when expanded. In front of the pectorals two prominent, acute, serrated spines, with a bony process at their external base, are observed in place of the ventrals. Between these spines is situated a bony plate formed like the head of a lance, granulated upon its surface, serrated at its edges, with a central carina. (Plate VIII. Fig. 3.)

The anal commences posterior to the dorsal, and terminates on a line with that fin. Like the dorsal, it is preceded by an exceedingly minute spine.

The caudal is scarcely emarginated.

The fin rays are as follows : — D. 2-1-11. P. 10. V. 1. A. 1-6. C. 12. Length two inches to two and a half.

*Remarks.* Specimens of this species were brought me by my son, Horatio R. Storer, from small pools of water left at low tide on the rocks at Nahant, and also from the marshes at Brookline. Captain Atwood has likewise sent me individuals from Provincetown.

Massachusetts, STORER. New York, MITCHILL, DEKAY. Nova Scotia, H. R. STORER. New Brunswick, PERLEY.

This species may perhaps have been the one referred to by Forster and Pennant ; but it does not seem to be the Northern Two-spined Stickleback, which has been lately described by Girard from specimens brought from Labrador by my son, under the name of *G. Cuvieri*.

### GASTEROSTEUS QUADRACUS, *Mitchill*.

#### *The Four-spined Stickleback.*

(PLATE VIII. FIG. 4.)

*Gasterosteus quadracus*, *Four-spined Stickleback*, MITCHILL, Trans. Lit. and Phil. Soc. of N. Y., i. p. 430, pl. 1, fig. 11.

*L'Épinoche à quatre aiguilles* (*Gasterosteus quadracus*, MITCH.), CUV. et VAL., IV. p. 504.

*L'Épinoche à bassin fendu* (*Gasterosteus apelles*, CUV.), CUV. et VAL., IV. p. 505.

*Gasterosteus apelles*, *Bloody Stickleback*, STORER, Report, p. 31.

*Gasterosteus quadracus*, *Four-spined Stickleback*, DEKAY, Report, p. 67, pl. 6, fig. 18.

“ “ “ “ STORER, Mem. Amer. Acad., New Series, II. p. 315.

“ “ “ “ STORER, Synopsis, p. 63.

*Color.* When alive, greenish-brown above the lateral line ; beneath this line, which is very perceptible, the color is darker, and is broken irregularly by the extension of the whiteness of the abdomen. In young specimens the color is distributed in four or five transverse bands, which are indistinct in the mature fish. The membranous portion attached to the posterior inferior part of the ventral spine is of a bright scarlet color, which causes this part to appear as if covered with blood, when the fish is suddenly darting through the water, with the spine projecting.

*Description.* Body slightly convex in front of the first dorsal spine. Length of the head equal to nearly one fifth the length of the body. Three or four movable spines are situated in front of the dorsal fin, with a membrane at their base. Directly before the dorsal fin, and connected with it by a membrane at its base, is a fifth spine, which is equal to about two thirds the height of the rays of this fin. Commencing at the base of the first spine, and terminating at the spine of the dorsal fin, is situated a groove, into which the larger spines are received when recumbent. The first and second spines are each equal in length to one third of the head ; when erect, one or more of these spines frequently project outward from the straight line ; the others are shorter ; the fourth, when there are five, is the shortest.

The rays of the pectorals are very delicate.

The ventral spine is serrated on its anterior edge.

The os innominatum extends, on each side, almost to the anus. At the origin of the anal fin is situated a recurved spine, rather larger than that at the origin of the dorsal fin.

The first rays of the anal fin are the highest. This fin terminates opposite the dorsal fin.

The caudal fin is slightly rounded, when expanded.

The fin rays are as follows : — D. 3 or 4, 1–12. P. 11. V. 1. A. 10. C. 13. Length one to two inches.

*Remarks.* This species, which Mitchill concisely described and badly figured in his paper on the Fishes of New York, is found in large numbers in creeks to which the sea has access, from Boston to Provincetown, and also in the mouths of rivers.

Massachusetts, STORER. New York, MITCHILL, CUVIER, DEKAY.

In this species, as in others of the genus, the number of dorsal spines varies. Cuvier's *Noveboracensis* is probably a variety with three spines, and my son has taken specimens with five spines in salt marshes at Cambridge.

GASTEROSTEUS DEKAYI, *Agassiz*.*The Many-spined Stickleback.*

(PLATE VIII. FIG. 5.)

*Gasterosteus pungitius*, *Ten-spined Stickleback*, STORER, Report, p. 32.*Gasterosteus occidentalis*, *Many-spined Stickleback*, DEKAY, Report, p. 68, pl. 42, fig. 135.

" " " " STORER, Mem. Amer. Acad., New Series, II. p. 315.

" " " " STORER, Synopsis, p. 63.

*Gasterosteus Dekayi*, AGASSIZ, Lake Superior, p. 311.

*Color.* When alive, this fish is of a grayish-yellow color, with from six to ten transverse dark bands upon its sides, which are very distinct in some specimens, while in others they are scarcely visible. In the same individual, these bands are much more apparent at some moments than at others, as the fish is excited by fear or other causes. The opercula and abdomen are silvery. Pupils black; irides metallic. After death the color of the fish is much lighter, and the bands, in a great measure, disappear.

*Description.* Body much elongated. Greatest depth of the fish rather more than one eighth of its length. Length of the head one fifth the length of the entire fish. The mouth opens obliquely downwards; the jaws are armed with great numbers of minute teeth. The eyes are circular; the diameter of the eye is equal to about one quarter the length of the head. The lateral line commences at the posterior superior angle of the operculum, and pursues a slightly declining course to a line over the anus, from which it passes in a straight line to the tail. A strongly marked carina upon each side of the tail, which is crossed by twelve or more plates.

Upon the dorsum are situated from eight to ten incurved spines, inclining to the right and left. The first of these spines arises on a line midway between the opercula and pectoral fin.

The dorsal fin arises on a line directly above the anal spine, and gradually diminishes in height, until its rays are scarcely perceptible.

The ventral spines are stout, sharp, somewhat incurved, serrated upon their upper edge, with a membrane at their base. A bony plate is situated between the ventral spines, which terminates posteriorly in a point.

The anal fin is similar in its form to the dorsal; its spine is recurved.

The caudal fin is rounded.

The fin rays are as follows: — D. 8 or 9 or 10. 1–7. P. 11. V. 1. A. 1–9. C. 13. Length one to two inches.

*Remarks.* This pretty species, which is less common than the *quadracus*, is found



in the salt marshes along the sea-coast in company with that species and the different killifish.

Agassiz considers this species distinct from the *occidentalis* of Cuvier, and has accordingly named it for Dekay, who had previously expressed doubts of its identity.

Maine, H. R. STORER. Massachusetts, STORER. New York, DEKAY.

### FAMILY III. SCLÆNIDÆ.

This family is very similar to that of the Percoids, and presents nearly all the same combinations of exterior characters, especially the denticulations of the preoperculum, and the spines of the operculum; but it has no teeth, either on the vomer or palatines; in general, the bones of the cranium and face are cavernous, and form a snout more or less rounded. It often occurs in this family that the vertical fins are rather scaly. Some of the genera have two dorsals, others but one.

#### GENUS I. OTOLITHUS, Cuv.

The bones of the anal fin are weak, and there are no barbels; some of the teeth terminate in elongated hooks, or are of the canine form. Their natatory bladder has a horn on each side, projecting forwards.

(*To be Continued.*)

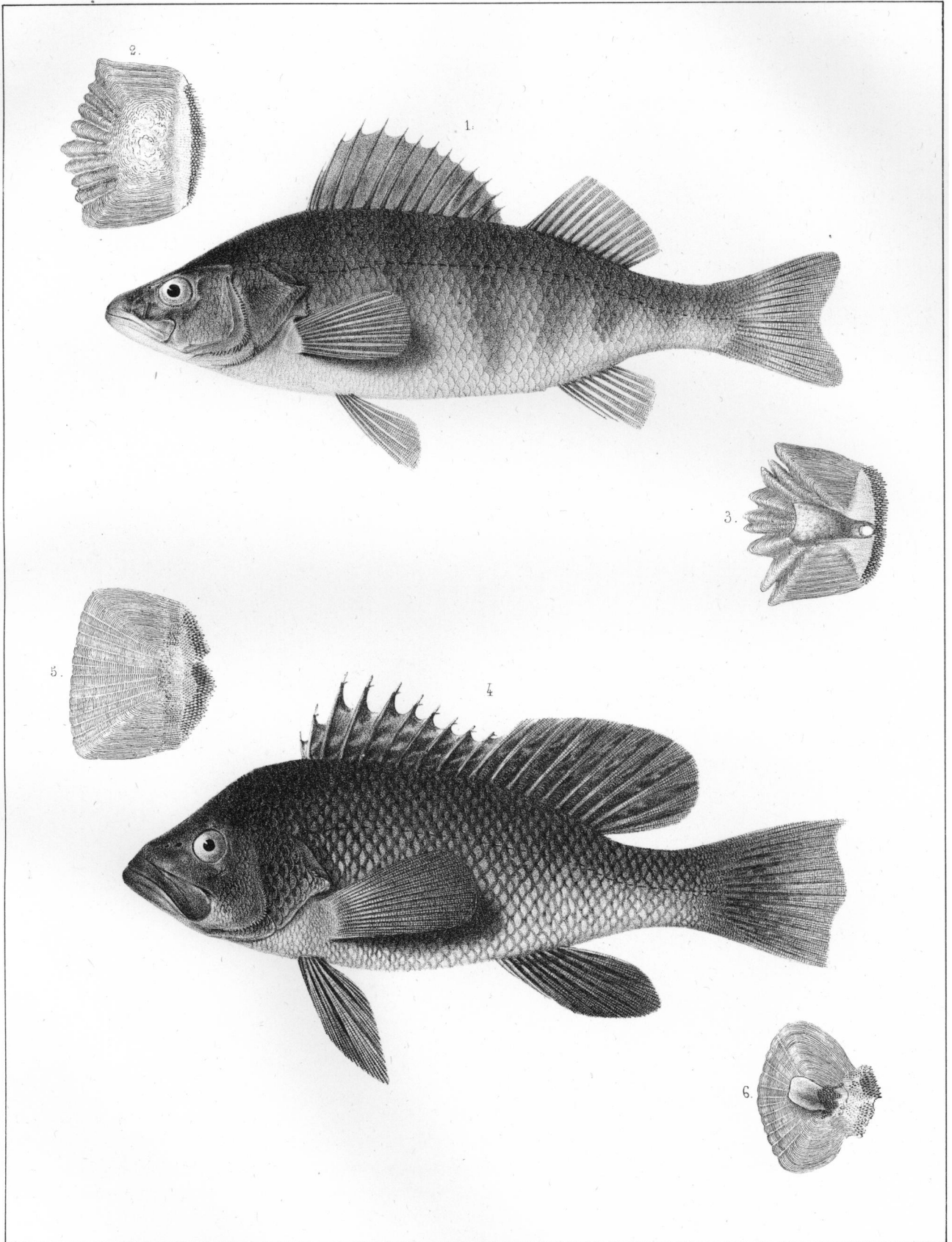


Tappan & Bradford's lith.

A. Sauer on stone

1-3. LABRAX RUFUS. Dekay.

4-6. LABRAX LINEATUS. Cuv.

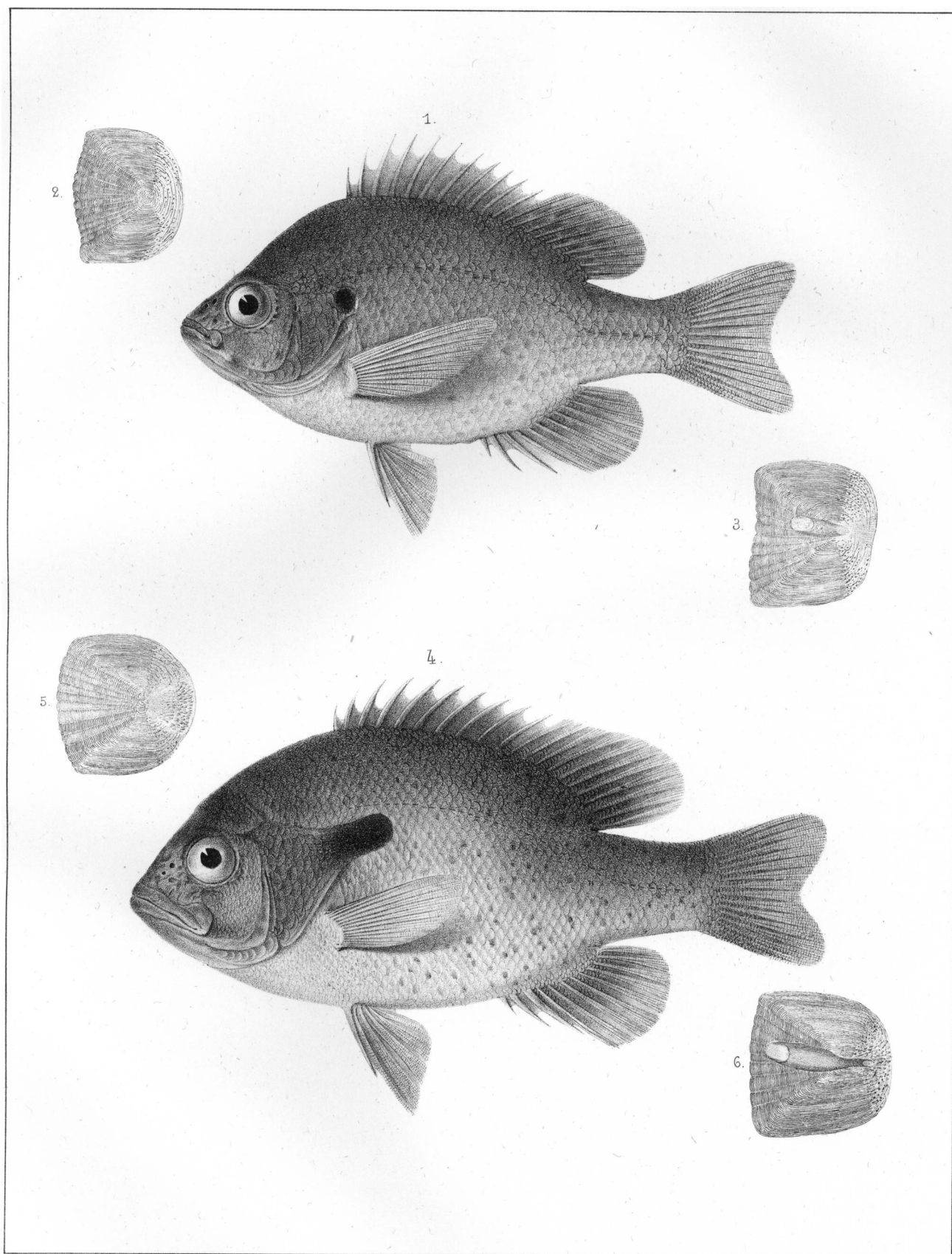


Tappan & Bradford's lith.

A. Sonrel on stone.

1-3. PERCA FLAVESCENS Cuv.

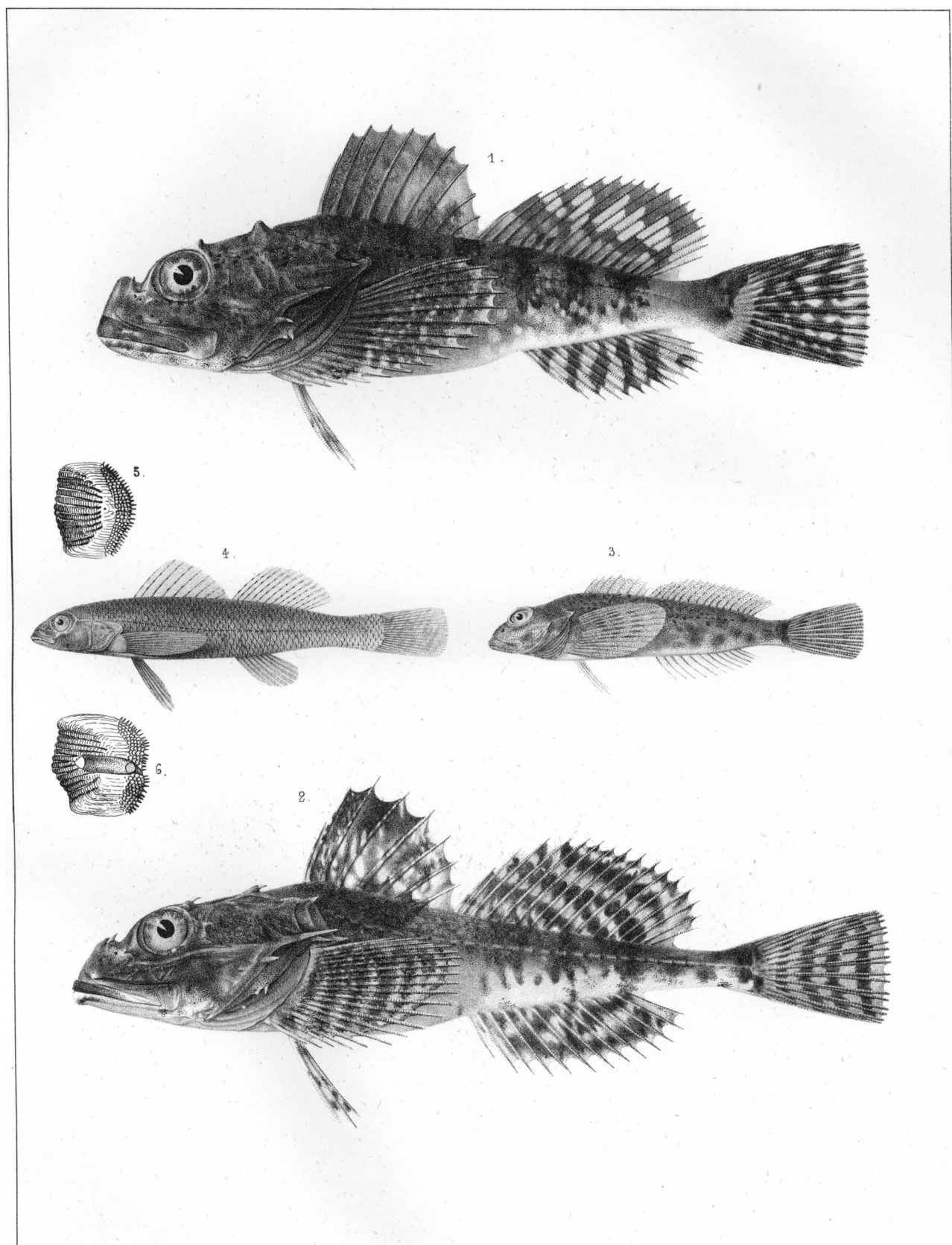
4-6. CENTROPRISTES VARIUS Storer.



Tappan &amp; Bradford's lith.

A. Sonrel on stone.

1-3. POMOTIS VULGARIS Cuv. 4-6. POMOTIS APPENDIX Dekay.

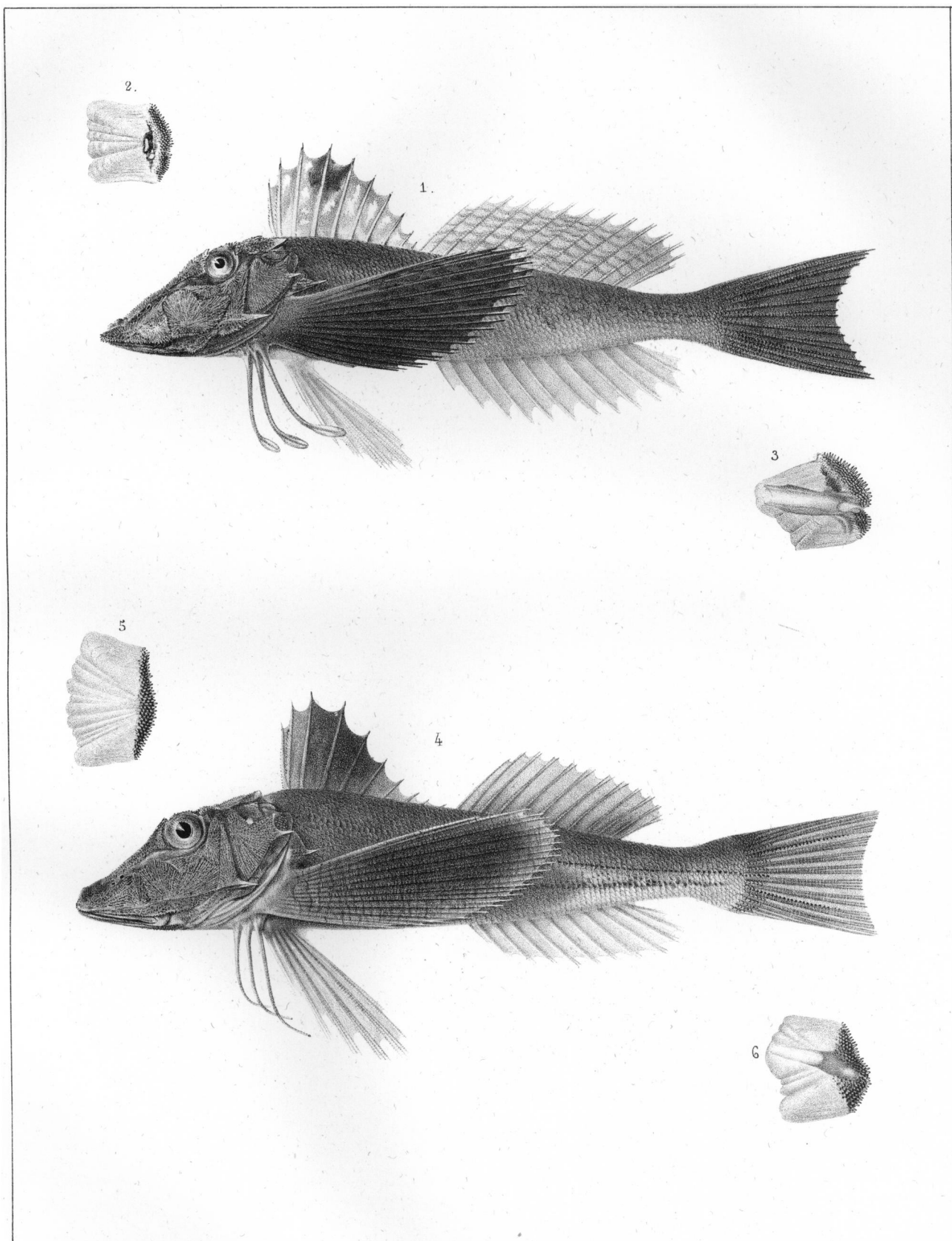


A. Snnrel.

Printed by Tappan &amp; Bradford.

1. ACANTHOCOTTUS VARIABILIS Girard. — 2. A. VIRGINIANUS Girard.  
 3. COTTUS GRACILIS Heckel. — 4-6. BOLEOSOMA OLMSTEDI Ag.

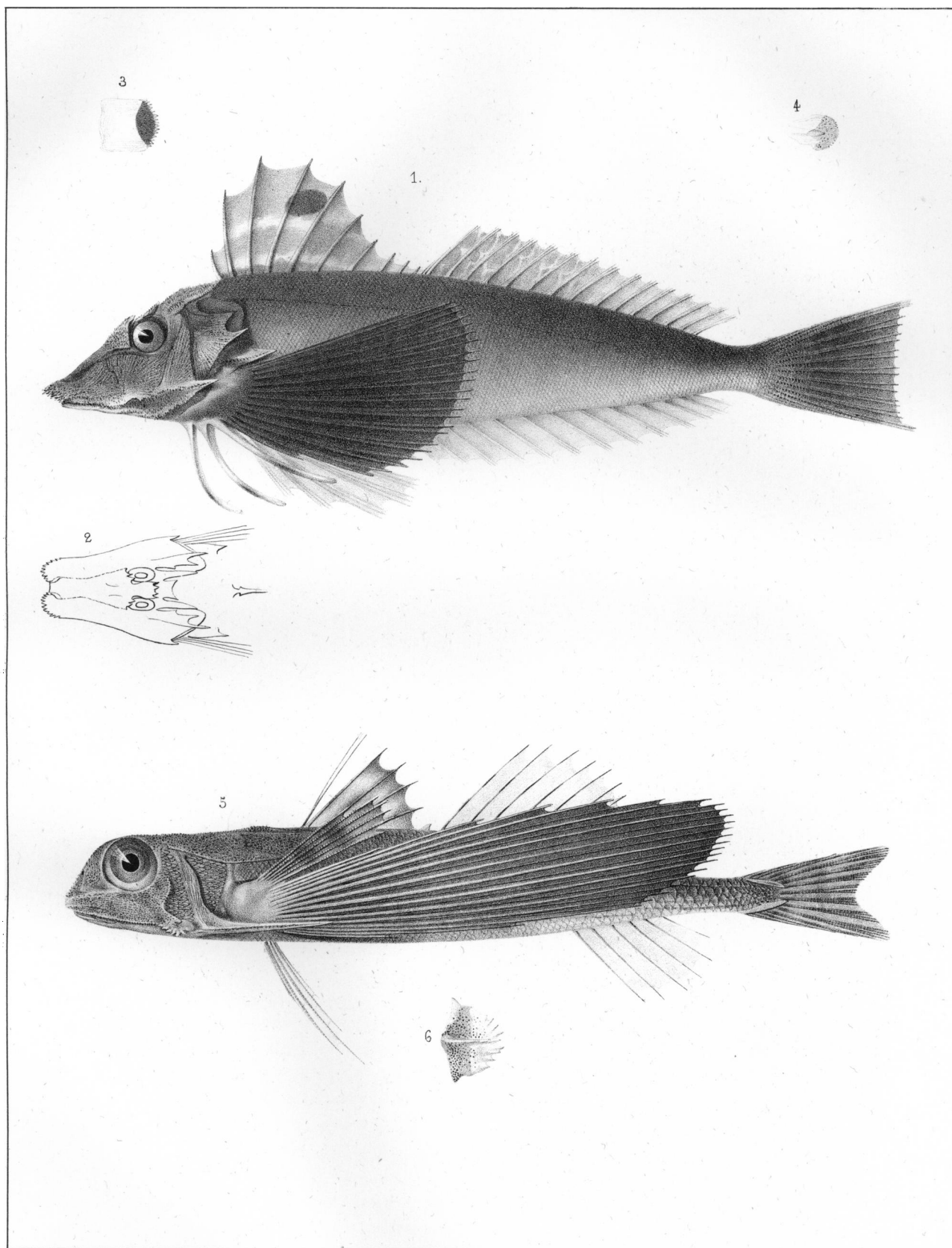




A. Sonrel.

Printed by Tappan et Bradford.

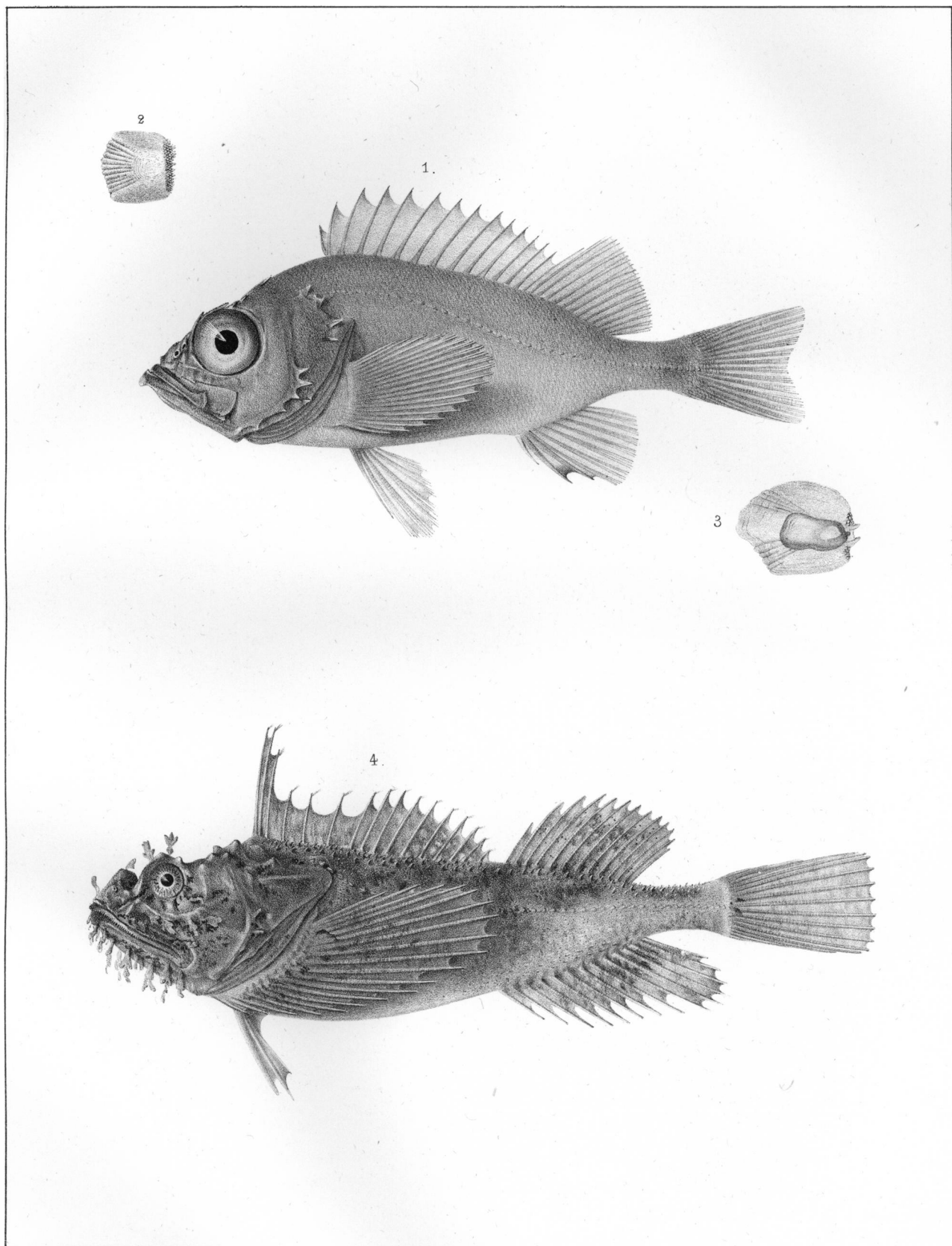
1-3. PRIONOTUS PALMIPES Storer.~4-6. PRIONOTUS LINEATUS Dekay.



W.H. Tappan & A. Sonrel from nat.

Printed by Tappan & Bradford.

1-4. PRIONOTUS PILATUS Storer.— 5, 6. DACTYLOPTERUS VOLITANS Cuv.

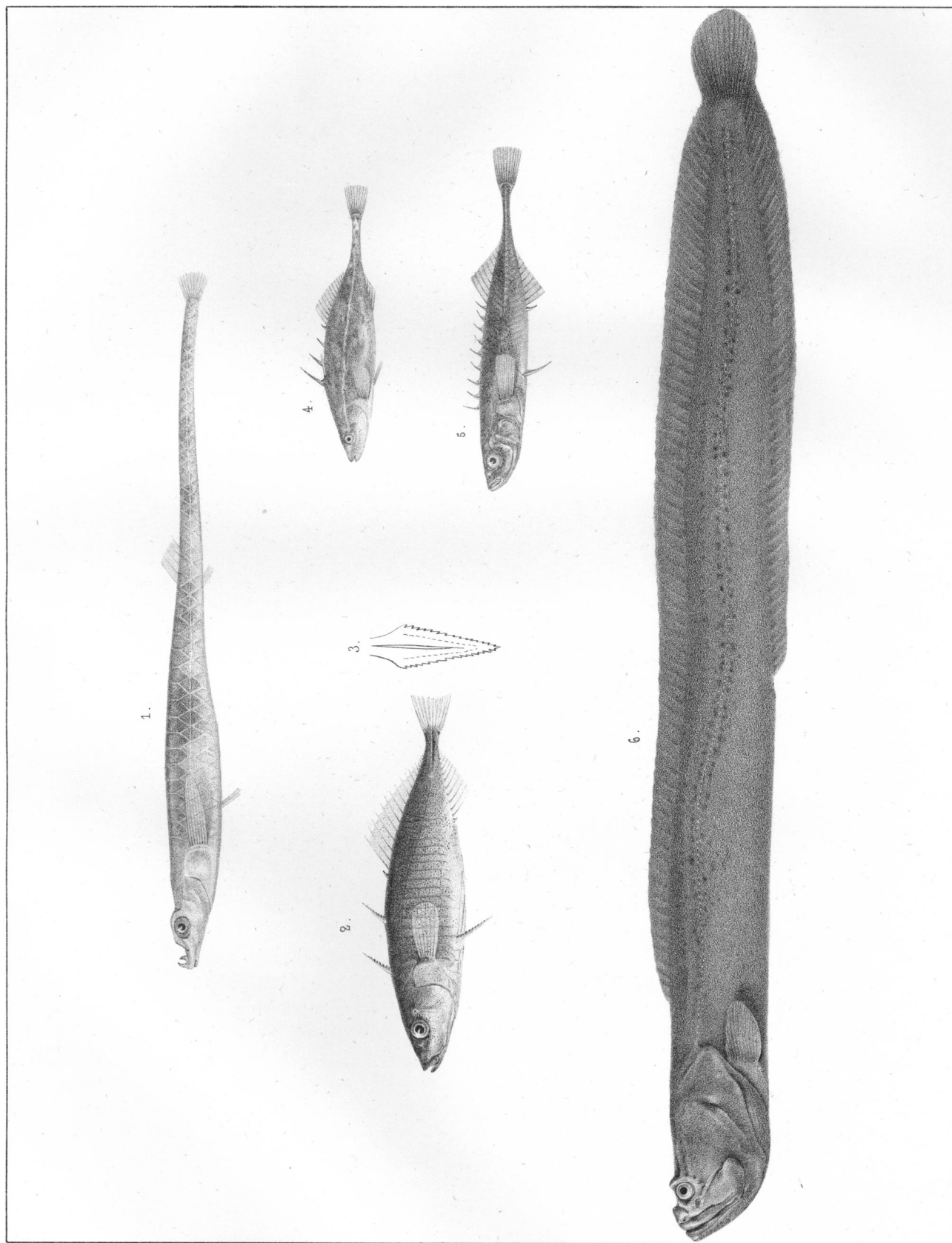


A. Sonrel from nat.

Printed by Tappan & Bradford.

1-3. *SEBASTES NORVEGICUS* Cuv. — 4. *HEMITRIPTERUS ACADIANUS* Storer :





W. H. Tappan & A. Sonnet from nat.

Printed by Tappan & Bradford.

1. ASPIDOPHORUS MONOPTERYGIUS Cuv. ~ 23. GASTEROSTEUS BIACULEATUS Mitch. ~ 4 G. QUADRACUS Mitch.  
 5. G. DEKAYI Ag. ~ 6. CRYPTACANTHODES MACULATUS Storer..